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FUNGUS DISEASES OF THE SKIN

CLINICAL ASPECTS AND TREATMENT *

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BOSTON

I have been asked by the council of the association to present the clinical aspects of the fungus diseases of the skin. For the sake of comparative brevity, I shall limit myself to the consideration of the more newly recognized types of fungus infections, i. e., so-called epidermophytosis, dermatitis saccharomycetica and cutaneous thrush.

EPIDERMOPHYTOSIS

These conclusions are based entirely on a study of my private records of 1,013 examples observed from 1910 to 1925, inclusive.

TABLE 1.—*Incidence of the Disease*

Year	No. Cases	Year	No. Cases
1910	3	1918	31
1911	5	1919	79
1912	11	1920	87
1913	14	1921	131
1914	20	1922	118
1915	17	1923	148
1916	21	1924	156
1917	25	1925	147

It is obvious from the figures in table 1 that this infection was, only a relatively few years ago, comparatively uncommon. Perhaps dermatologists were unfamiliar with its characteristics. They undoubtedly were ignorant up to a certain point but the subsequent increase in knowledge in no way accounts for the steady and rapid rise in the incidence of the disease from year to year, certainly not after 1915. The striking increase in the prevalence of the infection in 1921 over the preceding year should be noted. On the other hand, it appears from the figures above that saturation has perhaps been reached during the last few years—in other words, it seems as though the susceptible persons are now infected.

* Read at the Golden Anniversary Meeting of the American Dermatological Association, Philadelphia, May, 1926.

DISTRIBUTION

One morning last December I asked the ten members of a fourth year section of the Harvard Medical School how many had epidermophytosis. Seven men raised their hands! Curiosity led me to look up the provenance of these ten students. Two came from Massachusetts, two from Maine and one each from New Foundland, Pennsylvania, West Virginia, Oklahoma, Texas and Oregon. The distribution was widespread—New Foundland to Texas, Texas to Oregon—the whole country appears to be in the grasp of this infectious disease.

TABLE 2.—*Age of Incidence*

Age	No. Cases
18 months	2
1st decade	10
2d decade	117
3d decade	260
4th decade	225
5th decade	162
6th decade	128
7th decade	48
8th decade	8
9th decade	1

TABLE 3.—*Duration of Disease before Consultation*

Duration	No. Cases	Duration	No. Cases
6 days or less	8	5 years	24
1 week	15	6 years	18
2 weeks	46	7 years	19
3 weeks	17	8 years	14
1 month	50	9 years	9
2 months	48	10 years	13
3 months	43	11 years	9
4 months	27	12 years	9
5 months	31	13 years	2
6 months	36	14 years	1
7 months	5	15 years	7
8 months	9	16 years	2
9 months	7	17 years	1
10 months	4	18 years	1
1 year	89	20 years	4
2 years	79	25 years	3
3 years	52	30 years	2
4 years	44		

It is thus evident that persons of all ages are susceptible to epidermophytosis. The third and fourth decades show the greatest susceptibility, just about one half of the patients being between the ages of 20 and 40.

DURATION

My custom has been to inquire of each new patient how long this disease had existed before he consulted me. Table 3 reveals the greatest diversity in time and strikingly illustrates the love of the plant for its host when left unmolested, and often its great tenacity and obstinacy, for the majority of these men and women had had considerable treatment before coming under my observation.

ETIOLOGY

Epidermophytosis is caused by a mold which Dr. Weidman will describe. In what manner is this organism picked up and allowed to implant itself on and in the horny layers of our skins? This is difficult to answer comprehensively, for experience has shown me that this plant gains admission seemingly in many ways. I will mention some of them, although I cannot vouch for their accuracy.

During the war many women came to me with the initial vesicles on the lateral aspects of their fingers. Between these affected fingers worsted thread was passing for many hours of the day while they were knitting. When a tight-fitting woolen bathing suit was used the bather would be aware of chafing, and within a day or two "red-flap" would appear on one or both upper inner thighs. A young woman would don woolen tights for a ride; the tights would prove heating and "red-flap" would result. Among the most common sources of infection are woolen socks. During the war soldiers and civilians used them, and many susceptible persons were victims of this source of infection. Woolen gloves, to a much lesser extent, have played a similar etiologic rôle.

Leather is likewise a source of infection, and I have seen instances apparently attributable to baseballs, gloves, reins, handles of golf clubs, trusses, straps of wrist watches and shoes worn without stockings. A young man who wore a leather strap as a support to his instep showed the telltale vesicles in the underlying skin of the arch of his foot.

Suspensory bandages and athletic clothes worn many times in hot scrimmages and seldom washed are prolific sources of infection. Silk underwear also was a mischief maker in one case: A woman who was very particular about her silk shirts and drawers, and who would not have them washed until her own laundress could attend to them, carried with her, when starting for Bermuda, enough of these garments to ensure her cleanliness during her six weeks' sojourn from home. As each suit was worn and discarded it was put in a clothes hamper; and thus, impregnated with sweat and epithelial débris, it was left over a period of weeks in the dark, unventilated, in this hot moist island climate, to become a nidus for the plant life in the atmosphere. These clothes were eventually washed; but washing does not destroy this mold, nor does boiling, in my opinion. These rejuvenated garments were finally worn again and almost at once this woman came to me practically covered with epidermophytosis—the most remarkable example of the macular form of this disease I have ever seen.

The floors of shower baths have proved sources of infection. Once I was called in consultation to a boarding school where there were six boys with various types of infection about their feet; their common bond was that they all used the same shower bath. A like instance is recorded in which twenty-three members of a golf club were infected.

A wet sponge in common use in a bowling alley seemed to be the mode of infection of another of my patients.

Perhaps the most unthinkable method of contamination in my experience was that of a mother whose son I was treating for this disease. She confessed to me that more than once she had taken her son's used towels from the soiled clothes basket and wiped her genitals with them. In consequence, her labia and upper thighs were thoroughly infected.

These are evidently some of the many methods of contagion. One etiologic fact is deeply impressed on my mind—persons do not get this disease directly from one another; an inanimate object, it seems, must form the connecting link between man and man.

Another distinct impression is that as a whole Americans are not very susceptible to this organism. I base this seemingly contradictory assertion on the fact that in all my 1,013 examples only a relatively few instances of familial infections could be detected—in fact in less than 6 per cent of this rather large number.

TABLE 4.—*Occupation in Relation to Number of Cases*

Occupation	No. Cases
Housework or none	224
Student	172
Clerical work	153
Physician, nurse or dentist	69
Salesman	41
Teacher	29
Handler of leather	24
Lawyer	22
Household servant	20
Handler of wool	17
Clergyman	14
Bank teller	5
Other occupations	67

OCCUPATION

Does man's labor play any part in this contagion? A study of table 4 seems to indicate that it does not, although without knowing the exact relativity of one occupation to another, one is thinking in the dark.

The figures in table 4 reveal, in the main, the activities of the persons with the disease. There is one possible exception, and that is the relatively large number of students infected. Even this ratio, however, can be explained more by extracurricular avocations than by the main calling of the patients' lives.

SEX OF PATIENTS

Of the patients 621 were males and 392 were females, a feature which I cannot explain. Why is there this preponderance of males (61.3 per cent) over females (38.7 per cent)? Are men more susceptible to this disease than women? Are men less cleanly in their habits? Or do men take more athletic exercise than women and thus come more closely in contact with wool and leather?

MORPHOLOGY

As noted in tables 5 and 6, epidermophytosis seems capable of appearing in at least ten different guises and of attacking almost every part of the human integument, and its toxins can be absorbed and produce a more or less general rash—surely a protean disease. Usually the infection produces not more than one or two of these specified forms in a person; sometimes the eruption is pure, or again three or more varieties of lesions may appear in one patient.

TABLE 5.—*Types of Lesions*

Type	No. Cases	Type	No. Cases
Vesicular	382	Papular	52
Scaling	370	Callous	52
Macular	305	Keratotic	47
Macerated	159	Lichenified	26
Fissured	112	Purpuric	1
Epidermophytides	49		

TABLE 6.—*Locations of Lesions*

Location	No. Cases	Location	No. Cases	Location	No. Cases
Toes	341	Instep	57	Right thigh alone	16
Fingers	279	Backs of feet	48	Heels	16
Both thighs	264	Left thigh alone	42	Under breasts	13
Palms	235	Balls of feet	40	Legs	12
Soles	148	Pubes	33	Umbilicus	11
Axillae	115	Bends of elbows	29	Neck	10
Backs of hands	68	Labia	24	Popliteal spaces	9
Perineum	62	Nails	23	Arms	8
Intergluteal folds	61	Penis	22	Trunk	4
Scrotum	59	Flexors of forearms	22	Scalp	2

THE VESICULAR FORM (24.5 PER CENT)

Vesicles are the most common manifestation of the disease, and, as primary lesions, seem to be limited to the fingers and palms, rarely occurring on the backs of the hands, and to the toes and soles. Usually these vesicles are intracutaneous. They tend to be discrete but may coalesce; are likely to be of rather uniform size, round and domed, and approximately 1 mm. in diameter, and seldom become pustular. They often have a dark steel-blue center, a phenomenon which should always make one suspect epidermophytosis. Occasionally, vesicles can be superficial, and then they are decidedly small and easily confused with those of dermatitis venenata.

When on the fingers and toes vesicles prefer the lateral aspects; but when more numerous they appear on the flexor surfaces. At their maximum number they seem to creep around on to the dorsal aspects of the digits, but in such cases seem to limit themselves to the first phalanges, and then are accompanied by considerable underlying redness These digital vesicles soon break because of the local thinness of the skin, pressure, heat and moisture. This secondary process naturally

evolves more rapidly on the toes. In such cases differentiation must be made from eczema madidans.

Vesicles on the palms are essentially prisoners because of the density of the superjacent horny layer. For this reason palmar vesicles are more prone to coalesce than those elsewhere. They seem to dry up, probably from absorption; or time and natural processes may bring them to the surface where they seem to burst like bubbles on the water, and a little round collarette of scales may mark their point of emergence. This phenomenon should be remembered and not confused with palmar syphilis, psoriasis or arsenical keratosis.

Vesicles on the soles are generally confined to the arch of the foot. They are likely to appear in a group, and as the stratum corneum is fairly thin there they often break, and rather delicate serpiginous outlines reminiscent of syphilis may be seen.

All these local epidermophytic vesicular processes are marked by periods of ebullition and subsidence, but all are more common in the warmer months of the year, for plants like warmth and moisture. Vesicular epidermophytosis may exist without subjective symptoms, but the majority of cases are marked by itching, often of the most severe nature. This type of the disease is probably the most amenable to proper treatment; in the palms the cure is delayed by the very depth of the process.

In other types of epidermophytosis, vesicles may occasionally be observed arising secondarily, but it would seem proper to defer their consideration to their appropriate chapters.

THE SCALING FORM (23.1 PER CENT)

Scaling in epidermophytosis seemingly may be a primary process or may follow some obvious precedent pathologic condition. Scales are most commonly observed on the sides of the fingers or of the toes, in their webs, on the palms or on the soles.

In what may be called the primary type these scales are small, partially adherent and usually white. They may be termed squarish in shape. To disclose these rather insignificant lesions about the toes, which commonly have entirely escaped the notice of the patient, the toes must be stretched one from another and there, partly adherent and partly free, they are seen by the practiced eye. Or again the foot must be turned upward and the junction of the toes and the ball of the foot searched, for these points also are favorite seats of the lesions. Frequent searchings emphasize the fact that the fourth interspace is the favorite seat of scales followed by the third space as a poor second. When forcibly removed from their seats these scales do not cause bleeding. In certain instances scales may be so pronounced and so numerous that the merest medical tyro or the patient himself cannot fail to observe them.

In the secondary type of desquamation, scales may be most commonly observed after or in connection with almost any of the different forms of epidermophytosis, including epidermophytides. One consequent type must be mentioned, however, and that is the circular, already alluded to in connection with vesiculation. Here, usually on the palm, much less often on the sole, one notes the pea-sized hollow circle, the bursted bubble already described.

Pruritus is not a frequent concomitant of pure and simple desquamation. Scaling epidermophytosis is an obstinate variety of the disease but not the most unyielding.

THE MACULAR FORM (19.6 PER CENT)

This is the type of epidermophytosis first recognized, originally discovered by Hebra as long ago as 1869, and called by him eczema marginatum. Within a few months Körbner, Pick and Kaposi had revealed the mycotic nature of the disease. Since then the condition has been called red-flap and jockey strap itch.

The seat of predilection of this macular variety of the disease is the upper inner thigh, not the groin primarily. My statistics show that this type is much more common in men than in women—to be exact, four times as prevalent. The heating influence of the scrotum undoubtedly explains this local masculine susceptibility. Further study of my figures reveals the fact that both thighs are usually infected (264 to 58), but when one is diseased it is the left in the ratio of 42 to 16. Here again daytime contiguity of the scrotum is the probable determining factor.

As a rule, the plant gains admittance to the skin at one focus and thence spreads slowly, usually downward and inward, and to a lesser extent outward, stopping generally in men at the lower border of the scrotum in relaxation and at a corresponding point also in women. The downward progress of the plant, however, may be much more extensive and in one of my patients reached to the knees. The lower border of this eruption is sharp and when arising from a single focus it forms one continuous gentle curve. When multifocal, the border is generally mildly serpiginous.

Not uncommonly the growth may extend inward and backward and then invade the perineum. It may not infrequently involve the perianal region and travel backward and upward to the extreme upper boundary of the intergluteal fold, but here the eruption assumes another type which will be described under the head of maceration.

At times the genitalia are involved. In the male the underside of the penis may show one or more round, pea-sized points of redness, moisture and rawness. The circumcised glans penis may present a sharply bounded, elevated, deep mahogany colored patch. The scrotum may

also produce a superficial redness, moisture and rawness or again a dryness and marked thickening, even with hypertrophic rugae or at times peculiar, pea-sized, red, raw, dome-shaped papules. In the female the labia majora often become thickened and darkened, and even tough and leathery, and less frequently the labia minora may become contaminated and appear thickened and hypertrophied, often extending beyond the borders of the great lips. Epidermophytosis of the female genitalia is usually accompanied by severe itching.

More rarely the progress of growth is upward, thus involving the pubes but never the pubic hair. This condition is very different from the older types of ringworm. It is distinctly uncommon in my experience to find the actual groin invaded to any real extent.

The common type of this form of the disease produces a pink-red maculation, at times slightly elevated. Scaling is rarely appreciable, probably because of the warmth of these affected regions. It is, therefore, a simple form of eruption. It does not disappear by central clearing.

The thighs and their environs are not the sole seat of this macular form of epidermophytosis. The axillae are not infrequently infected. The general appearance of this localized eruption is similar to that observed about the thighs. The outbreak is generally limited to the actual hollow of the axilla but as in the femoral type the growth may extend downward, less often forward, seldom backward. The lower limit of progress is variable. I have seen it extend almost to the crest of the ilium.

Maculation may extend under the breasts and when the mammae are pendulous moisture comes into play and there are maceration, papulation, papulopustulation and exulceration. This disease must be differentiated carefully from thrush.

The umbilicus can be attacked. Here the infection assumes a special type. It may extend to the bottom of the navel; it almost always reaches across its lower border and downward for half an inch. The infiltration is appreciably thicker; the color is generally mahogany and moisture is the rule.

The macular type on the backs of the hands and feet seems to arise from the interdigital spaces and spreads out fanwise and red to form uniform, slightly infiltrated, sharply bounded areas.

The scalp presents the rarest localization of the disease, and so far as I am aware has been recorded only three times. My only observation revealed the following characteristics: the follicles for the most part appeared as patulous mouths like the openings of a pepper box. Between these orifices and covering and obliterating others was a curious, brick-red, rather glistening and seemingly fibrous, curiously tortuous, elevated tissue with no suggestion of scales. Here and there, apart from this

extraordinary development, was noted a papery exfoliation somewhat like that of a partially extinguished favus; the hairs of the scalp were not in the least affected.

Finally, it is possible to have the whole body, more or less, affected by macular epidermophytosis as in the case of the woman who left her used silken underwear unwashed in a hamper for weeks in the hot moist climate of Bermuda. This is the only case of the kind I have seen.

THE MACERATED FORM (10.2 PER CENT)

The seats of predilection of this form of the disease are the webs of the fingers and of the toes, the intergluteal valley, the contact points of the penis and scrotum and the submammary folds. The clinical appearances in the latter two regions have already been described.

Maceration between the toes and between the fingers presents itself as clean, white and sodden tissue of various degrees of thickness. The webs of the toes are more frequently and more intensely affected than those of the fingers. The fourth toe spaces present this condition most severely. Here the water-soaked tissue reaches its maximum and here one sees at times the epiphenomenon of a veritable cast—a smooth, oval, soft, white, lardaceous, easily detachable body like an egg lying in its nest—a unique condition. Between the buttocks, postanally, maceration is not uncommon. Here one notes a long streak of soft, parboiled, white tissue, of appreciable depth—not a mere superficial film. Here, unlike the simple sodden state between the digits, one observes also accompanying, lateral, angry red signs of inflammation. Itching is not a factor in interdigital maceration, but between the buttocks it forms a distressing symptom.

THE FISSURED FORM (7.2 PER CENT)

Cutaneous cracks in epidermophytosis are largely limited to the hands and feet. It is common, on close observation of the toes, to find short, straight breaks across the webs vertically or again on looking at the plantar surfaces to note short, deepish, lateral fissures at the junction of the toes and balls of the feet. Over the internal aspect of the great toe joint callous formation is not rare, and here there may be a superficial or a deep crack. On the calloused heel fissures are often found, varying in depth according to the thickness of the underlying hyperkeratosis. These fissures are usually irregular, seldom straight and generally yellow.

On the hands cross cracks, short, shallow or deep, are seen at the junctions of third phalanges and metacarpals. On the palms they are not common and they are usually superficial. Here may be seen one of the rarest types of epidermophytosis, which in previous papers I have described as the railroad map type. I have likened these multitudinous

criss-cross, black lines to the railroad folder pictures of the rail lines in Pennsylvania or in the environs of Chicago.

Fissured epidermophytosis is usually free from subjective symptoms and now, with the recent introduction of a new therapeutic measure, is not so difficult to cure.

THE PAPULAR FORM (3.3 PER CENT)

This type of the disease is, as our percentage figures show, one of the less common of its manifestations. It may occur on the free surfaces or where cutaneous areas oppose each other. In the former case the eruption is dry, the papules being of medium size, rounded, closely aggregated, free from scales and cuticolored. On the lower aspect of the penis and under pendulous breasts the lesions become red and moist and sooner or later erosive. On the scrotum when free from contact with the penis, papular epidermophytosis assumes a special form. The lesions are of good size, domed and a peculiar dark red.

Like most papular dermatoses this form of epidermophytosis is peculiarly obstinate to treatment, and, running true to form, it is likely to be pruriginous.

THE CALLOUS FORM (3.3 PER CENT)

Epidermophytosis is inclined to hypertrophy in regions in which the stratum corneum is normally abundant. On the palms hyperkeratosis is relatively mild but common; on the soles it is decidedly emphasized and still more frequent. The inner side of the big toe joint often assumes this condition but presents no other characteristic. On the ball of the foot one sees a peculiar but possibly not pathognomonic appearance. Here, lying transversely and medially, one encounters an oval, strangely translucent, sharply bounded hyperkeratosis which may be yellow or more often a striking orange. On the heel the process is likely to form a horseshoe shaped rim and here is often seen the densest variety of the disease. It may assume a striking canary yellow but more often it is a dirty white. It is customary to find this tissue streaked with deep or deeper cracks. As would be supposed this form of the disease proves especially recalcitrant to treatment. It generally is free from subjective symptoms except when the deeper fissures are present, and then pain adds to the patient's discomfort.

THE KERATOTIC FORM (3 PER CENT)

This type, like that of the callous, shows its predilection for palms and soles. Round, symmetrical keratoses the size of a split-pea appear, sometimes projecting above the surface, at others lying embedded in the horny layer with often a well-marked, circumferential, moatlike sunken rim. Naturally, these clinical aberrations suggest arsenical keratoses, but other objective symptoms of this drug are missing.

It may well be mentioned in this connection that warts seem particularly to thrive on this epidermophytic soil. The therapeutic hint should be obvious.

THE LICHENIFIED FORM (1.7 PER CENT)

It is an accepted fact that pruritus plus some cutaneous idiosyncrasy paves the way for lichenification, and in epidermophytosis, so often pruriginous, this curious and interesting epiphenomenon is not infrequently found. The macular type of the disease seems to furnish the greatest number of cases, and the inner and anterior upper mid-thighs, the axillae and the extreme upper central portions of the buttocks provide the favorite sites. There is nothing peculiar or pathognomonic, subjectively or objectively, in this special lichenification—the same highly pruritic, elevated, infiltrated, from blue-red to brown, superficially whitely criss-crossed conglomeration of firm angular papules is noted. The same vicious circle of itching and scratching is here as elsewhere observable, and in the treatment of this special instance of lichenification its peculiar provocation must be borne in mind.

THE PURPURIC FORM (0.06 PER CENT)

Purpura on an epidermophytic base is the rarest type of the disease. It requires no comment; its characteristics are the same; its extraordinary origin is its only peculiarity.

INVOLVEMENTS OF THE NAIL

Epidermophytic infection of the nails is not rare, occurring in twenty-three instances in my 1,013 patients. It is never wise to dogmatize in the clinical attributes of diseases of the nails. Nails are essentially single in their structure—they have no different layers, they have no adnexa; therefore, it seems to me that their pathologic condition cannot be complex or pathognomonic. Hence, as in numerous other diseases, there are thickening, opacity, dirty grayness or yellowness, vertical striation, friability, disintegration and separation of plate from bed or subungual hyperkeratosis. One or many of these symptoms may be present in this disease; one nail or all may share in the process. Subjective symptoms are absent. Disease of the nails is the most difficult of all forms of epidermophytosis to cure.

EPIDERMOPHYTIDES (3.1 PER CENT)

Unlike tuberculids, the toxic sequelae of epidermophytosis are simple in their morphology—maculation with more or less fine adherent scaling seems to constitute, in my experience, the only objective characteristic. The legs primarily, and thighs, to a lesser extent, are the favorite seats of this interesting reaction. Greater absorption seems capable of pro-

ducing still more widespread eruption, and in one instance in my experience the whole body was involved, including the buccal cavity. In this extraordinary case of acute, marked and intense vesiculation of the hands, lower forearms, feet and lower legs, the tongue, cheeks, hard and soft palate, tonsils and posterior pharyngeal wall were suffused with a dusky, solid redness. Sore throat and general lassitude accompanied these mucocutaneous symptoms. The disease, in this instance, cured itself, probably by the formation of antibodies, the whole process from beginning to end consuming approximately twenty days.

Mild itching is the general rule. The process fades spontaneously as the active infectious foci yield to time or to treatment.

TREATMENT

The physician's first duty is to remember to warn the patient that epidermophytosis is an infectious and contagious disease, communicable to his susceptible intimates and to an even greater extent auto-inoculable. The patient must be warned against contact with leather or woolen objects of dress, toilet and sport; he must be told not to wear wool, silk or leather next his skin; only boilable materials should be allowed to touch him; articles which have come in contact with his affected areas must be used only once, then boiled apart from the rest of the household linen, and finally hung inside-out in the sun for a whole day, for I am not convinced that boiling kills this plant; shower baths must be forbidden unless the affected feet are covered with cotton stockings; the use of paper towels, running water and liquid soap should be encouraged when practicable; the practice of shaking hands should be discouraged; the infected areas should be kept cool—bandages, wool or leather gloves, high boots, etc., should be tabooed.

The local treatment of this disease has proved most disappointing and disheartening to the patient and to the physician, and this statement is equally applicable in England, France and America. The Englishman has relied on Whitfield's ointment, the Frenchman has relied on tincture of iodine and on chrysarobin, and Americans have tried many things and all in all have largely failed. The possible duration of the disease up to thirty years seems to corroborate this pessimism.

I am appending the many drugs and methods which I have tried, and I feel justified in saying that not one of these varied substances can be depended on to effect a rapid or a sure cure. Patients, however, do get well and sometimes extraordinarily rapidly. I feel confident that they are helped materially and I know that almost all of them will improve subjectively and objectively up to a certain point. I suspect, however, that many of the cures are effected more by internal chemical processes than by the use of external applications.

For cleansing purposes and for reducing the horny layer I have used hot soaks, pumice stone soap, Flash soap and the grinding effects of hot, dry sandy beaches. In the treatment of vesicles I have opened the deep ones antiseptically and to all types applied ether, tincture of iodine, hot soaks in solution of potassium permanganate, 1 per cent, saturated boric acid solution, solution of trinitrophenol, 10 per cent, or copper sulphate, 0.4 per cent, or painted them with a solution of

	Gm. or Cc.
Oil of cinnamon	2
Thymol	5
Alcohol to make	200

or again

Ether	2
Balsam of Peru	4
Collodion flexible	32

On moist or macerated areas I have employed crude coal tar in from 6 per cent to 100 per cent strength, as:

	Gm. or Cc.
Crude coal tar	2
Zinc oxide	2
Petrolatum to make	20
or black lotion N. F. ("black wash")	

On the macular, scaling, fissured or hyperkeratotic forms I have used the following ointments: Whitfield ointments no. 1 and no. 2; salicylic acid 2, precipitated sulphur 2, lard 32, mercurous chloride 10, lard 32; red mercuric sulphide 0.1, salicylic acid 1.5, benzoic acid 2, precipitated sulphur 3, hydrous wool fat 30, petrolatum 30; yellow mercuric oxide 0.1, petrolatum 25. On epidermophytides in summer I have restricted myself to the following wash:

	Gm. or Cc.
Phenol	2
Calamine	6
Zinc oxide	8
Lime water to make	250

and to the following wash in winter:

	Gm. or Cc.
Phenol	2
Calamine	6
Zinc oxide	8
Glycerin	8
Distilled water to make	250

Finally, in all forms I have made use of the roentgen ray.

This long, varied list signifies only one thing—a confession of therapeutic weakness.

However, this is not the whole truth, for during the last few months I have turned my attention to a 2 per cent aqueous solution of mercurochrome-220 soluble (dibrom oxymercuri fluorescein) in almost all forms of epidermophytosis, and I no longer dread the appearance of a new patient with this disease or the reappearance of an old patient. I am sufficiently experienced to appreciate that a few months' trial may not be enough to prove the worth of any drug in so complicated a disease as epidermophytosis; and yet I have confidence enough to say that in my own use of mercurochrome I have found a drug superior to any I have tried in this most obstinate and refractory disease. Mercurochrome is not 100 per cent perfect, but it is proving far more effective than any drug I have employed before.

In the use of a 2 per cent solution of mercurochrome, all customary rules and regulations as to hygiene and antisepsis must be strictly adhered to as with any other form of medication in epidermophytosis. The liquid is applied by means of a sterile swab once a day at first and subsequently twice a day. No bandages are allowed. The drug's only irritating quality seems to be that of too great desiccation, and perhaps in this very quality lies its value, for plants need moisture for their well being. The drug may be effective because of its fluorescent quality. Within a certain number of days it becomes obvious to the patient and to the medical observer that fissures are forming in the painted areas; these cracks are signals to cease applications, for the accompanying pain is often severe enough to keep the patient awake at night. When the fissures have healed, as they will in a few days with the cessation of treatment, applications should be resumed, but only once a day. As pathologic symptoms disappear the drug should be used less and less, but treatment with it should be continued at decreasing intervals for a month after the disappearance of the last objective vestiges of the disease; only by such a conservative method can one be sure of destroying the plant in the deeper layers of the skin and thus preventing relapses in the near or distant future. The drug is readily soluble in water and can, therefore, be easily removed from the skin when desirable. The drug when once dry is adherent to the skin and then does not stain surrounding objects unless the patient perspires. This solubility and adherence are two valuable and practical qualities which make a strong appeal to the patient when compared with his previous experience with greasy, soiling ointments. The ease of application is in strong contrast with the time-consuming soaks of premercurochrome medication.

THE PROPER NAME FOR THE DISEASE

The use of the term epidermophytosis has been strictly adhered to throughout this paper. There are good and valid reasons for this choice. This is a disease of the epidermis. The plant grows on or in the

epidermis. Therefore epidermophytosis is etymologically as well as pathologically correct.

The popular synonyms for this infection should be considered next. The word ringworm is in use. Ringworm has a definite clinical meaning to physicians, hallowed by time. Ringworm is often an infection of the hair; epidermophytosis has never been known to attack the hair. Ringworm forms circles; epidermophytosis never does. Ringworm produces a curious pustular condition known as kerion; epidermophytosis is never pyogenic although there may be at times purulent superinfection.

The term trichophytosis is favored by some writers, but this would fail for the same reasons. Etymologically, trichophytosis signifies some growth connected with the hair, but no one as yet has recorded the observation of this plant in or around the hair shaft on any part of the body or head.

The title dermatophytosis has some followers. This name is not proper because in the present instance the derma, not the epiderm, is being dealt with.

Tinea has been suggested. Already there are tinea tricophytina, tinea favosa and tinea versicolor. Under such conditions the word tinea alone would surely convey no specific idea.

What are the objections to the word epidermophytosis? If Sabouraud had not in the early days of the knowledge of this relatively new condition stated that it was caused by *Epidermophyton inguinale*, the present objectors to the term epidermophytosis would have no grounds for their opposition. These opponents claim that in perhaps only one third of the cases is this specific plant the causative factor. Cannot the advocates of the name retaliate in the same measure? Are the words trichophytosis or ringworm any more defensible etiologically, for even our antagonists admit that a certain proportion of the cases are caused by *Epidermophyton inguinale?*

American physicians, therefore, should forget for the moment the exact plant at fault and adopt this etymologically correct word, epidermophytosis, for this comparatively new composite disease—for, after all, this is what the French, German and Italian dermatologists have done.

DERMATITIS SACCHAROMYCETICA

For thirty years and more it has fallen to my lot to treat Russian Jewesses. Like other women they have peculiarities. Coincident with childbearing, the weight increases rapidly and pari passu the fingers become thicker and thicker until proximally flesh touches flesh, local aëration disappears, warmth, moisture and darkness supervene, and a hotbed is formed suitable to the growth of any nearby plant. The Russian Jewess of the poorer class is first, last and always a housewife.

She is given to orthodoxy, and among her tenets of faith is the abhorrence of soap in the washing of her dishes for fear lest the dreaded pig should, as an ingredient of soap-fat, find its way into her mouth. Kosher soap and washing powders are used by some modernists but the bulk of these women use nothing in the cleansing of their dishes. There can be only two results to this archaic method—dirty dishes and dirty dishwater. Thus anatomy and housework together produce a type of infection of the fingers which in my experience is limited to one sex and to one race.

For many years, therefore, at the Massachusetts General Hospital, I have observed this peculiar condition of the web of the fingers. The infection usually attacks the cleft of the middle and ring fingers or that of the middle and forefingers on one or both hands; sometimes, though not often, two interspaces on one hand may be involved. The affected area is dirty white, soft from edema, sharply bounded and frequently shows a fine, red angry selvage. Pain at times may be severe. The latest writers are now claiming that this peculiar eruption is caused by *Oïdium albicans*. At the Massachusetts General Hospital I have seen so little of this condition recently that I cannot affirm or deny the claim.

The treatment has been simple and generally quickly successful. The women have been instructed in the art of hygienic dishwashing. They have been told to scrape the dishes well before attempting to wash them; to use boiling hot water, a sufficiency of washing powder and a boiled dish mop. They have been told how to push one dish at a time out of the water by means of a long-handled fork so that the rim of the dish can be grasped between the thumb and forefinger, then thoroughly mopped and then lifted on to a drying frame. They have been told to allow the dishes to drain well before wiping. By such methods dishes may be washed properly without even a drop of water getting on the the hands. The women have been instructed how to apply "black wash" in the most effective way:

	Gm. or Cc.
Mild mercurous chloride	2
Calcium water	250

(1) The bottle should be shaken well and the amount of the wash to be used poured into a saucer; (2) a piece of old handkerchief, a little larger than the infected area, should be wet in the wash and placed between the fingers; (3) this should be left in contact for five minutes by the watch; (4) this should be repeated twice more. This means fifteen minutes of black wash twice a day. Between the applications a drying antiseptic powder should be dusted in frequently. Patients who have obeyed our instructions implicitly are expected to be cured within a week.

There is a seemingly new type of dermatitis saccharomycetica. Modern women often wear no washable garments about their neck, upper chest and back, or axillae, or down their arms. The older-fashioned undershirts with long sleeves and the later adopted shirt-waists are gone, and at present nothing touches these areas of the skin but the outer garments. Perspiration and epithelial débris of necessity accumulate in these unwashed fabrics, and the nidus for passing aërial organisms is provided. Sooner or later the transfer to the susceptible skin occurs.

The usual primary focus seems to be the bend of the elbow, and in the average woman this remains the only area infected, but in two recent examples the lateral roots of the neck, the axillae, the flexure of the elbows and the groins shared in the process. This wide distribution, however, is uncommon in my experience. Curiously enough, I have seen two examples of this yeast infection involving the soft tissues of the lower eyelids, in both of which the plant was demonstrated microscopically. Infection in these cases is in all probability due to transference by the patient's hands, for to rub one's eyes is a common trait.

The clinical features of this type of dermatitis saccharomycetica are a striking pale buff color, a sense of adherent microscopic scaling as in tinea versicolor, none too sharply bounded outlines, strict symmetry revealed by flexing the arm tightly, and pruritus, often very trying.

In this form of the disease it is difficult to effect a cure. I have not had the opportunity, however, of trying mercurochrome-220 soluble. "Black wash" is unsuccessful in the dry type. An ointment of salicylic acid and precipitated sulphur has given as much success as anything in my practice.

THRUSH

My report up to this point has been based on purely personal experience. What I will say in concluding this paper is based entirely on a recent and valuable article by Dr. Bedford Shelmire of Dallas, published in the December number of the ARCHIVES, for I have done no work on the thrush organism.

According to Shelmire and his numerous predecessors, *Oïdium albicans* is capable of producing lesions in the mouth, the vagina and probably the rectum. These facts have been known for many years. More recently this plant has been found by clever inquisitives in various cutaneous eruptions, many of which have their analogues in epidermophytosis.

Shelmire divides his thrush types into those acquired in perpetual baths, especially in regions of the skin which are at times in the water and again in the air; those following the use of wet dressings; those occurring in infants primarily in the mouth, vagina or rectum, and subsequently spreading to contiguous and even distant parts of the skin; those appearing in nursing mothers about the breasts, nipples or

submammary areas; those on the penis and scrotum of men whose wives are infected genitally; and, finally those occurring intertriginously —the last type perhaps somewhat redundant. Shelmire also hints that many examples of paronychia are due to *Oïdium albicans*. He also claims that erosio interdigitalis blastomycetica seu saccharomycetica is due definitely to *Oïdium albicans* and not to a yeast fungus.

Thus all can appreciate that cutaneous thrush may be almost as polymorphous as epidermophytosis—in fact many of Shelmire's clinical descriptions of thrush tally closely with our objective ideals of epidermophytosis, and for this reason it seems unnecessary for me to prolong this already lengthy paper by repetitive clinical descriptions. Must dermatologists then in the future examine microscopically and culturally every example of epidermophytosis, no matter how familiar the type, before pronouncing the final diagnosis?

There is only one loophole in this idea, one possible clinical aid: cutaneous lesions produced by the thrush organism tend much more toward erosion than those due to the causative factor of epidermophytosis.

A REVIEW OF THE LITERATURE

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A review of the literature which has appeared during the last two years on the subject of fungus diseases reveals the increasing recognition of the importance of the subject and the fact that treatment has lagged behind clinical and laboratory investigation. Incidentally, the name epidermophytosis is coming generally to be used to represent the dermatologic entity discussed here. Comparatively little that is new has been done in the laboratory investigation of epidermophytosis, while a comparatively large number of investigations have been published on the diseases in which yeasts are found.

From the clinical point of view, Guy and Jacob[1] discuss whether a case of "eczema" of hands and feet should be treated as parasitic before demonstrating the parasite, and conclude that clinical diagnosis only is necessary. They believe that susceptibility varies markedly and state that the only factors in regard to susceptibility of which they are

1. Guy, W. H., and Jacob, F. M.: Differential Diagnosis of Parasitic Infections of Hands and Feet, Penn. M. J. **26**:384 (March) 1923.

certain are hyperhidrosis and injury. Hyperhidrosis is present in a great majority of cases, and severe exacerbations of chronic mycosis are produced by it. Injury they believe is a definite factor; mycotic conditions of the nails, especially, often date from injury. They describe the more common types of eruption: (1) intertriginous—fissuring and macerated; (2) the less common and often unrecognized for years—involvement of nails. It may involve one or more nails. The nails are described as dry and brittle, with cross striations and possible longitudinal ridges. The ends may be broken and thin, or protruding with irregular edges, with heaps of powdery scales at the free edge. These cases must be differentiated from syphilis, psoriasis and atrophy of the nail. They state that in mycotic infections soothing applications usually make the condition worse. Their article particularly emphasized the importance in an obscure case of finding a source of infection—the feet or the nails.

Dixon [2] gives a clinical description of the usual mycotic diseases of the skin. His treatment is soap and water and Whitfield's ointment. In one case he cultivated from the leather insole of the patient's shoe the same fungus that was grown from the lesion on the foot. Cultures were obtained from the leather as late as four months after the patient had stopped wearing the shoes.

Alexander [3] describes trichophytosis localized in the palms and soles. He states that the disease either can be typical or may appear as a simple desquamating dyshidrosis. It can also resemble pemphigus. He was able to cultivate the fungus in nine cases out of thirteen, and considers it to be trichophyton gipseum.

Lovejoy [4] reports three cases of epidermophytosis of the hands occurring in one family, and considers that the infection was spread from one to the others by means of a roller towel.

McGlasson and Lehman [5] give a complete description of epidermophytosis. They point out the frequent association of skin and nail infection and consider that roentgen-ray therapy in most cases shortens the course of the disease by at least one-half.

Butler, Houghton and Cooper [6] publish a careful article on mycosis of the hands and feet. They give a statistical study of the occurrence

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2. Dixon, H. A.: Fungi in Diseases of the Skin, Canad. M. A. J. **14**:1097 (Nov.) 1924.

3. Alexander, A.: Trichomycosis on Extremities, Med. Klin. **18**:1550 (Dec. 3) 1922; abstr., J. A. M. A. **80**:440 (Feb. 10) 1923.

4. Lovejoy, E. D.: Trichophytosis Cases—Three Cases in One Family, California State J. Med. **21**:380 (Sept.) 1923.

5. McGlasson, I. L., and Lehman, C. F.: Epidermophyton and Trichophyton Infections of the Skin, Texas State J. Med. **19**:626 (March) 1924.

6. Butler, C. S.; Houghton, J. E., and Cooper, G. F.: Mycosis of Hands and Feet, U. S. Nav. M. Bull. **21**:615 (Nov.) 1924.

of mycoses in the naval service, giving figures from 500 cases investigated. The cases were drawn from four groups: marines, hospital patients, officers and hospital corps men. While the incidence of mycoses of the hands and feet for all four groups was 13.2 per cent, that of the officers alone was 90.9 per cent. Complement-fixation tests were consistently negative, and the authors consider that this result squares with the symptomatic recurrence and chronicity of epidermophytosis. For treatment, potassium permanganate is recommended, using with it acid peroxide of hydrogen to remove the stain. A liniment of soap is also highly recommended. The roentgen ray in the treatment is considered unnecessary.

Guy and Jacob [7] report thirty-five cases of epidermophytosis appearing on recently healed vaccination scars. In twenty cases a fungus was found. Two types were isolated: epidermophyton inguinale and an unidentified fungus. Investigations of the vaccine used were negative.

Hulsey and Jordan [8] in an investigation of ringworm of the toes in university students conclude as follows: type of lesion—the macerative (soft corn) predominates, 88 per cent of all forms. From 10 to 15 per cent of those examined had had some other form of ringworm previously.

On the clinical basis, that is, from objective symptoms alone, 67 per cent of the student body have ringworm of the toes. On the evidence of the microscope 49 per cent were affected. Culturally proved cases number 5 per cent.

Most people are unaware that this form of ringworm constitutes a focal infection in relation to the dermatologic field just as there are focal infections in internal medicine.

Regardless of the question as to what constitutes ringworm of the feet, and how much symptomatology must exist in order to constitute disease, it remains as the outstanding feature of the foregoing conclusions that 5 per cent of the student body harbor living fungi, which are known to be the cause of ringworm (as proved by culture), and that from 10 to 15 per cent have had some other form of ringworm previously.

Thibierge, Legrain and Leblois [9] report the transmission of microsporon felineum to the glabrous skin in man. Ten cases are reported, the eruption in some being rather extensive and resembling pityriasis rosea.

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7. Guy, W. H., and Jacob, F. M.: Epidermophytosis, a Sequel of Vaccination, Arch. Dermat. & Syph. **12**:233 (Aug.) 1925.

8. Hulsey and Jordan: Ringworm of the Toes as Found in University Students, Am. J. M. Sc. **169**:267, 1925.

9. Thibierge, G.; Legrain, P., and Leblois, C.: Transmission of Microsporon Felineum to the Glabrous Skin in Man, Bull. Soc. franç. de dermat. et syph. **32**:262, 1925.

Arzt and Fuchs [10] likewise report a case clinically indistinguishable from pityriasis rosea, involving the hairy scalp, from which epidermophyton inguinale was grown.

Fox,[11] Pernet [12] and Freche and Cazenove [13] report cases of ringworm of the scalp in adults.

A. Neves [14] states that the microsporon of the cat (*Microsporon felineum*) is responsible for numerous cases of epidermophytosis in Brazil. The scalp is involved in less than 28 per cent of the cases.

Castellani [15] has investigated fifty-four cases of pruritus ani and has grown fungi in eleven of them from scrapings of the anoperineal region. He states that the fungi may remain dormant in the region for a long time, causing severe pruritus but practically no objective symptoms. There may be an associated eczematous dermatitis, and a secondary streptococcal infection may be engrafted. The fungi found were of the genus epidermophyton and trichophyton.

He states that there is no tendency to spontaneous cure. For treatment he uses:

	Gm. or Cc.	
Salicylic acid	4	
Mercuric salicylate	4	
Bismuth subnitrate	10	
Oil of eucalyptus	10	
Petrolatum or hydrous wool fat to make	100	(Deek's ointment).

He also uses:

	Gm. or Cc.
Silver nitrate	1
Spiritus aetheris nitrosi	30

This and the following should be used with great care:

	Gm. or Cc.
Chrysarobin	0.1
Petrolatum	30

Painting with potassium permanganate 2 Gm. to water 30 cc. is useful. In chronic cases the roentgen ray is valuable.

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10. Arzt and Fuchs: Skin Diseases Due to Epidermophyton Inguinale (Sabouraud), Dermat. Ztschr., June, 1924.

11. Fox, Howard: Ringworm of the Scalp in the Adult: Report of a Case Due to Microsporon Audouini, Arch. Dermat. & Syph. **13**:398 (March) 1926.

12. Pernet, George: Ringworm of the Scalp: Report of a Case in an Adult, Arch. Dermat. & Syph. **12**:267 (Aug.) 1925.

13. Freche, and Cazenove, E.: Eczematiform Epidermophytosis Caused by Trichophyton Acuminatum in Woman of 76, Ann. de dermat. et syph. **6**:341 (May) 1925.

14. Neves, A.: Dermatomycoses in Brazil, Brazil-med. **1**:144 (March 17) 1923; abstr., J. A. M. A. **80**:1739 (June 9) 1923.

15. Castellani, A.: Notes on Pruritus Ani of Mycotic Origin, J. Trop. Med. **27**:304 (Nov. 15) 1924.

In a later article [16] he elaborates on the preceding and also describes pruritus vulvae of mycotic origin. In a large proportion of the cases fungi of the genus epidermophyton were found. The condition is a latent epidermophytosis of the perianal region without the usual objective symptoms of an active epidermophytosis being present. It is usually associated with an epidermophytosis elsewhere. A definite diagnosis cannot be made without fungi being found microscopically or by mycological cultural methods but a diagnosis of probability can often be made from the clinical appearances, especially if the patient is suffering from mycotic dermatitis of the toes or gives a history of having suffered from tinea cruris. Mycotic pruritus vulvae is caused by the epidermophyton most frequently, occasionally by a trichophyton. The treatment is similar to that of mycotic pruritus ani.

Burgess [17] presents a report of 114 positive cultures from 140 cases investigated, giving the genera and species found. In 100 cases of nonmycotic skin diseases cultures were made from the normal or macerated skin between the fourth and fifth toes and in no cases was a positive culture of ringworm fungus found.

McCarthy,[18] working in Sabouraud's laboratory, has studied and described six new organisms.

Petges [19] gives a thorough general description of the eczematoid mycotic conditions. He goes into the subject of treatment in considerable detail. In general he advises against harsh treatment. He forbids at first washing the affected areas and uses a zinc lotion with zinc ointment. Occasionally the zinc ointment is employed in connection with the following wash:

	Gm. or Cc.
Zinc sulphate	15
Copper sulphate	15
Distilled water	300

1 soupspoon of this to a glass of water, followed by zinc ointment.

If the inflammatory condition is subsiding, at night he uses:

	Gm. or Cc.
Benzoated lard	35.0
Hydrous wool fat	15.0
Chrysarobin	0.5

16. Castellani, A.: Further Observations of Pruritus Ani and Pruritus Vulvae of Mycotic Origin, J. Trop. Med. **28**:329 (Sept.) 1925.

17. Burgess, J. F.: Fungus Infections of the Skin: Report of Cultural Study of Flora of Ringworm, Arch. Dermat. & Syph. **12**:853 (Dec.) 1925.

18. McCarthy, Lee: Epidermomycoses, with the Presentation of Six New Parasites, Ann. de dermat. et syph. **6**:19 (Jan.) 1925.

19. Petges, G.: Mycotic Eczema and Intertrigo, Paris méd. **13**:249 (March 17) 1923.

Zinc oxide ointment during day, or the following powder:

	Gm. or Cc.
Talc powder	100.0
Benzoic acid powder	2.0
Salicylic acid powder	2.0

In the "torpid" cases, like dry eczema, he treats with:

	Gm. or Cc.
Tincture of iodine	from 5 to 15
Alcohol, 95 per cent, to make	50

and powders with foregoing powder twice a day.

Also, in such cases, Whitfield's ointments are used or:

	Gm. or Cc.
Cocoanut oil	80
Petrolatum	20
Benzoic acid	5
Salicylic acid	3

	Gm. or Cc.
Petrolatum or benzoated lard	70
Anhydrous wool fat	30
Benzoic acid	5
Salicylic acid	3

After the condition has largely subsided he advises prolonged treatment of daily washing and powdering with the benzoic salicylic powder. He also considers it important to investigate the general condition of the patient.

An article on treatment by Glaze [20] recommends the use of a strong salicylic paste to remove the thickened epidermis from the soles. The formula is:

	Gm. or Cc.
Salicylic acid	60-75
Starch powder	15-30
Petrolatum	90

This is applied for from thirty to fifty hours. After desquamation a soothing ointment is used. The patient must be given explicit directions as to the use of this formula. He is instructed to apply the paste ¼ inch thick from the heel to the tips of the toes; to smear the tops of the feet with petrolatum or cold cream; to apply an old sock foot, drawing on a sock over all; and he is told to renew the applications twice daily if necessary; if unable to carry out the treatment continuously, he is instructed to apply it for successive nights. He is not to walk after

20. Glaze, A.: Treatment of Epidermomycoses of Feet and Hands, South. M. J. **17**:643 (Sept.) 1924.

putting it on. The author states that of seventy-four patients only five refused to finish the treatment after beginning it. It is not apparently well borne on the hand infections.

Doug-Ngoc-Dieu and Millous [21] emphasize the incurability of fungous infections of the skin in the Orient by any of the usual topical applications, and state that intravenous injections of Lugol's solution are permanently successful even in the most extensive cases. The authors use: Compound solution of iodine, 60 cc. in distilled water to make 300 cc. They begin with 5 cc. of this, give 8 cc. for the second injection, and 10 cc. for all subsequent ones. From four to twenty injections are necessary. They have never observed any hardening of the veins or any general trouble from this treatment.

Much new work is found on the subject of blastomycosis and allied conditions. Castellani [22] describes a new type of blastomycosis cutis (furunculosis cryptococcica, folliculitis decalvans cryptococcica) which is clinically entirely different from the usual blastomycosis, and which can hardly be distinguished from ordinary severe furunculosis. It attacks the scalp principally, causing loss of hair and sometimes areas of permanent baldness. The eruption begins as a follicular pyosis of the scalp, each pustule of which may be flattened or conical and pierced by a hair. In addition, there may be infiltrated lesions resembling flat carbuncles. On the face and body the lesions are indistinguishable from severe boils. An illustrative case gave cultures of *Staphylococcus aureus* and a cryptococcus. This cryptococcus was agglutinated by the patient's blood in high dilutions. Castellani concludes that the cryptococcus was the cause of the disease because staphylococcus vaccines did no good and because the patient was cured after using a cryptococcus vaccine and massive doses of potassium iodide, which usually makes the ordinary staphylococcus furunculosis much worse.

He also gives in outline a simple and useful classification of fungi and describes his mycological methods for the identification of various sugars and other compounds.

Castellani [23] supplements a previous report on furunculosis blastomycetica by further studies on the organisms found. He cites additional

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21. Doug-Ngoc-Dieu, and Millous, P. L. G.: Iodin Treatment of Trichophytosis, Paris méd. **13**:88 (July 28) 1923.

22. Castellani, A.: New Type of Blastomycosis Cutis (Furunculosis Cryptococcica, Folliculitis Decalvans Cryptococcica, J. Trop. Med. **27**:326 (Dec. 1) 1924; Fungi: Classification, Medical Mycology, Brit. M. J. **2**:1037 (Dec.) 1923.

23. Castellani, A.: Three New Yeastlike Organisms and New Bacillus, with Remarks on Clinical Conditions from Which They have been Isolated: Furunculosis Blastomycetica: Macroglossia Blastomycetica; Stomatitis Cryptococco-Bacillaris, J. Trop. Med. **28**:217 (June 15) 1925.

cases and adds another disease caused by the cryptococcus: macroglossia blastomycetica, stomatitis cryptococco-bacillaris. Of the disease furunculosis blastomycetica, or when it affects the scalp, folliculitis decalvans cryptococcica, he has seen five cases—three contracted in England and two in India. He gives a detailed description of the organism.

In macroglossia blastomycetica the whole tongue is greatly enlarged, occasionally painful. The typical verrucoid patches of blastomycosis are absent. Deep scrapings are made from the tongue after drying and painting it with tincture of iodine, and cultures are made. Potassium iodide has a beneficial effect, and vaccines prepared with the fungus seem to be beneficial.

In certain cases of stomatitis clinically totally different from thrush he isolated a fungus and a bacillus which apparently live in symbiosis.

The fungus he considers should be placed in the genus cryptococcus. Clinically the patches in the mouth do not resemble thrush. They are not raised and occasionally give the impression of incipient diffused leukoplakia. One of his cases was of English origin; in the others the patients came from Central America.

Carter [24] discusses the relation of blastomycosis to industrial accidents and cites three cases in each of which the patient could have established a claim for compensation in case of disability, basing the claim on the fact that there had been an industrial injury to the skin and that this wound was probably the starting point of the blastomycosis. This is of interest in considering the relation of epidermophytosis to industrial cases in which claims are made for compensation.

Coupal [25] reports six cases of general miliary blastomycosis and points out its close resemblance to tuberculosis. He states that blastomycosis can also produce the lesions which are called chronic inflammatory. (This article is illustrated.) It is possible for blastomyces to infect a tuberculous lesion.

Medical Science (London [26]) reviews the subject of blastomycetic infection of the nervous system and concludes that the appearance of sporadic cases in various parts of the world, with the frequency with which the reported cases were originally diagnosed as tuberculous meningitis, suggests that infection of the meninges with this kind of organism is much more common than is generally supposed.

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24. Carter, R. M.: Blastomycosis as a Complication of Industrial Accidents, J. Indust. Hyg. **5**:457 (April) 1924.

25. Coupal, J. F.: Blastomycosis: Report of Six Cases, Internat. Clin. **4**:1 (Dec.) 1924.

26. Greenfield, J. G.: Blastomycosis of Nervous System, Science **10**:267 (July) 1924.

Tannenberg [27] relates that the kidney pelvis on both sides in a male diabetic patient, aged 32, was obstructed with masses of the thrush fungus. Infection seems to have been ascending, and the changes in the kidneys indicated a chemical toxic action from the fungus in addition to an ordinary pyelonephritis.

Shelmire [28] describes infections of the skin by *Oïdium albicans*. These occur as disseminated lesions over large areas of the skin in water-bed treatment, after wet dressings and in nursing infants, and as localized lesions in contact areas of the skin (anus, genitals, under the breasts, and in axillary and interdigital folds). He carefully describes in particular the vesicular eruption seen on the hands and fingers resembling the so-called dyshidrosis; the type seen in infants, that following wet dressings, and intertriginous thrush infections. The nails may be infected. The diagnosis is made by finding the thrush fungus in fresh preparations from the scales and roofs of the vesicles. It is stated that there is only one case in the literature in which in the course of a moist and crusting arsphenamine dermatitis mycelia and clusters of spores of the thrush fungus could be demonstrated microscopically in the skin particles, the fungus apparently existing there as a saprophyte. On normal skin and in dermatoses of nonmycotic origin no mycelia or spore clusters can be found. Cultures from thrush infected cases are always positive. A type of chronic paronychia probably caused by thrush is also described.

Kingery and Thienes [29] describe an occupational dermatosis, the so-called "fruit poisoning." It is a dermatomycosis, hitherto undescribed, showing in addition to the skin manifestations a severe paronychia. Cultures uniformly gave pure cultures of a yeastlike organism. This is a thorough report.

Petges [30] states that the signs indicating mycotic intertrigo or intertrigo are those found in all cutaneous lesions due to yeast fungi: a greasy creamy discharge, early desquamation and the presence of islets of various sizes around the principal lesions. These signs call for microscopic examination. He has often found mycotic lesions in diabetes. Petges was skeptical of yeasts being the cause of the conditions ascribed to them, but has apparently changed his mind because of the numerous reports of positive observations of yeasts in such cases.

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27. Tannenberg, J.: Mycosis of Kidney Pelvis in a Diabetic, Ztschr. f. Urol. **17**:82-105, 1923; abstr., J. A. M. A. **80**:1549 (May 26) 1923.

28. Shelmire, Bedford: Thrush Infections of the Skin, Arch. Dermat. & Syph. **12**:789 (Dec.) 1925.

29. Kingery, L. B., and Thienes, C. H.: Mycotic Paronychia and Dermatitis: A Hitherto Undescribed Condition Apparently Peculiar to Fruit Canners, Arch. Dermat. & Syph. **11**:186 (Feb.) 1925.

30. Petges, G.: Epidermal Mycosis due to Yeast Fungus, Paris méd. **13**:256 (March 17) 1923; abstr., J. A. M. A. **80**:1882 (June 23) 1923.

Myers and Thienes [31] report a study of the effect of various volatile oils on fungus infections. A mixed spirit compound of a 5 per cent solution of thymol and a 2 per cent solution of cinnamon was found effective in several cases of epidermophyton infection of the hands and feet. A patient with pulmonary mycosis was successfully treated with the thymol-cinnamon mixture. A patient with actinomycosis, resistant to iodides and roentgenotheraphy, was apparently cured by the internal administration of thymol.

Thiroloix and Lafourcade-Cortinci [32] describe a severe and extensive involvement of the buttocks and thighs with multiple tumor-like swellings resembling extensive carcinomatosis. Later, the lymph glands were involved. The point of origin was evidently from an erythrasma-like area near the vulva. Biopsy showed that it was not carcinoma and that there was mycelium in the tissues. Positive cultures of a fungus were obtained from the blood stream and the tissues. The fungus at the time of report had not been identified and did not resemble any of the known pathogenic fungi. Large doses of iodides had no effect.

On the purely experimental side Chavarria, Pena and Clark [33] publish an article on the action of light on pathogenic fungi. The author's summary is as follows: 1. The roentgen ray, up to ten skin doses, has a slightly stimulating action on pathogenic fungi of the skin. 2. Visible and near ultraviolet light together are stimulating in moderate doses, but have a slightly inhibitory effect in heavy doses on nonpigmented fungi. 3. Nonpigmented fungi may be sensitized by eosin, and probably by other well known sensitizing dyes, so that they are readily killed by visible light. This reaction takes place in vivo as well as in vitro so that it may be of clinical importance. 4. Far ultraviolet light has a strong lethal action on nonpigmented fungi. 5. When a fungus, such as montoyela develops pigment under ultraviolet light, a long exposure is necessary to produce lethal action. Sublethal doses in this, and presumably in all species, result in stimulation, provided the doses are short enough. Therefore, it is suggested that the function of pigment in fungi, and in the human skin as well, is to regulate the energy absorbed by the underlying cells so that they receive only a sublethal stimulating dose. Pigmentation is, therefore, a defensive mechanism which favors stimulation and prevents lethal action.

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31. Myers, H. B., and Thienes, C. H.: The Fungicidal Activity of Certain Volatile Oils and Stearoptens; Their Comparative Toxicity on a Pathogenic Yeast-like Organism: Report of Clinical Utilization in Related Infections, J. A. M. A. **84**:1985 (June 23) 1925.

32. Thiroloix, I., and Lafourcade-Cortinci: Mycosis Resembling Carcinomatosis, Bull. et mém. Soc. méd. d. hôp. de Paris **47**:1320 (July 27) 1923.

33. Chavarria, A., Pena, and Clark, J. H.: Reaction of Pathogenic Fungi to Ultraviolet Light and Rôle Played by Pigment in this Reaction, Am. J. Hyg. **4**:639 (Nov.) 1924.

Nadson and Phillipov [34] found that radiation with roentgen ray had a marked effect on the formation of sexual forms in certain fungi, large doses having a deleterious effect, while small doses stimulated it.

Noting the difficulty in obtaining positive inoculations of *Achorion schoenleinii* and the trichophytons on the skin of experimental animals, and reasoning that the skin and nervous system have a common ectodermal origin, Arechia and Talaru [35] made experimental subdural inoculations of the achorion and a trichophyton endothrix in rabbits. They obtained positive results, and conclude that subdural inoculation is the best method to use in the investigation of achorion and trichophyton. This inoculation produces in the rabbit a pseudotuberculous meningoencephalitis.

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34. Nadson, G. A., and Phillipov, G. S.: Action of Roentgen Ray on Genital Function and Mutation in Lower Fungi, Compt. rend. Soc. de biol. **93**:473 (July 24) 1925.

35. Arechia, C. L., and Talaru, G.: Encephalitis Due to Achorion Schoenleinii and Trichophyton, Rev. neurol. **2**:231 (Sept.) 1923.

LABORATORY ASPECTS OF EPIDERMOPHYTOSIS *

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The subject will be arranged under the following headings.

1. Nomenclature and Classification: Bringing out the attitude of the taxonomist and the bearing it has on the selection of an appropriate name for these intertriginous (primarily and essentially) ringworms.

2. Etiology: The flora of normal skins. The rôle of bacteria, blastomycetes and hyphomycetes—are the last mentioned solely responsible for everything charged against them in epidermophytosis? A catalog and distribution (anatomic and geographic) of the various species reported. The status of the dermatophytids.

3. Laboratory Diagnosis.

4. Hygiene: The viability of ringworm material "extra corpore."

5. Histopathology.

6. Rational Therapeutics: What can the laboratory offer in this direction?

Before proceeding to the body of this paper, I wish to say that I have attempted to present the case in such a way that the reader will maintain a point of view in which he can judge the situation for himself; I am desirous not to overcolor the laboratory phases, particularly the determinative one.

NOMENCLATURE AND CLASSIFICATION

On the premises that this subject is that which was covered by White's [1] paper of 1919, and viewing the whole situation from the broadest angle possible, I believe that the disease is primarily and essentially intertriginous; i. e., one which may affect primarily the groin, toes, etc., but which may come secondarily to affect other parts of the body also. In other words, if the many variations in the expression of this disease are reviewed, but one theme is found which is common to all of the variants, and at the same time more or less distinctive from other cutaneous inflammations; i. e., an intertriginous location. Even such a standby as the causative agent fails in some of the cases; it is well known that it is impossible to demonstrate the fungus in some, and

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* From the Laboratory of Dermatological Research, University of Pennsylvania.

1. White, C. J.: J. Cutan. Dis. **37**:501 (Aug.) 1919.

that in some hyphomycetes and in others blastomycetes appear to be causative.

Granting these intertriginous affinities, the causative agent, or agents, which may be concerned in different cases next command attention. This should be determined, because not only does it establish a logical starting point when one attempts to determine the pathogenesis of the condition, but also, being more constant than any of the other features, it may become a starting point in the further nomenclature. Assuming, then, that "intertrigo" is adopted as the designation of the condition in general, inasmuch as the interest at this time is in the infectious cases, the subject might next be denominated "infectious intertrigo." This seems to be as far as one can go in a logical clinical nomenclature [2] up to the point when laboratory work is done and the precise etiologic agent is determined, unless the term acute or chronic, as the case may warrant, is inserted for further refinement in classification.

The amplification of the classification and nomenclature thereafter often depends on laboratory results: whether bacteria, blastomycetes or hyphomycetes are the cause, the appropriate adjective indicating the organism may be applied. Intertrigo may be classified as follows.

Physical and Chemical.

Macerative, mechanical, autolytic, etc.

Infectious.

(*a*) Bacterial:

Streptococcic, staphylococcic, diphtheritic, etc.

(*b*) Blastomycetic:

Cryptococcic, saccharomycetic, etc.

(*c*) Hyphomycetic:

Sporotrichotic, epidermophytic, trichophytic, etc.

I am aware that this classification may engender objections because it includes bacteria and blastomycetes among the causative agents. It should be recalled, however, that I have presumed to deal with intertrigo in its entirety, including those forms which affect children and others in hot weather, and that while this would not come within the scope of epidermophytosis to which this paper was supposed to be confined, expansion of the subject should be granted if a broader medical understanding will result thereby. The question whether bacteria and blastomycetes can act at all as causative agents will be dealt with elsewhere in this paper. It may appear, too, that the classification is too complicated. Actually, this is not the case; on the other hand, it is

2. Some clinical forms are sufficiently distinctive to indicate that they are of bacterial causation, others that they are "blastomycetic" and others that they are hyphomycetic. There is a goodly residue, however, in which this is not the case.

flexible. To illustrate by a specific instance, ringworm of the toes should be designated as "infectious intertrigo of the toes," until the causative fungus is determined; after that it would become "hyphomycetic," "blastomycetic" or "trichophytic intertrigo of the toes," as the case might be. These phrases are not unwieldly, compared to other dermatologic terms, and they are worth while because they express the precise stage to which the diagnosis has been carried. There should not be any hesitancy in using these terms, now that fungi are being studied accurately by dermatologists in general, in order to conform to the progress medical mycology is making. In the more extensive cases of ringworm, in which the axilla and groin were affected as well as the toes, the diagnosis could be put down as a "hyphomycetic intertrigo of the toes with generalization," or simply "multiple hyphomycetic intertrigo." "Toes, axilla and neck" might be placed in parenthesis after the latter diagnosis, if it were necessary to specify the parts affected.

The foregoing presupposes that etiology is accepted as the basis for classification and nomenclature. I am quite aware that in the past, morphology and distribution have counted the more, but so much more is definitely known today of the causative agent in ringworm than in many other dermatoses that there should not be any hesitation in relegating morphology to a secondary or supplementary position. The foregoing classification of intertrigo illustrates the field in which the diagnostician would locate his case, and the order of the inquiries he would make of himself when first approaching an atypical case.

But suppose that dermatologists do not care thus to enlarge the scope of the subject, and to broaden out so radically in nomenclature. Assuming that it is unnecessary or undesirable to indicate the intertriginous theme of this dermatosis, caused by many different species of fungi and with such diversity in the way both of morphology and of distribution, what name should be applied to it? I am conscious that I am reviving the perennial, or better, eternal, squabble about nomenclature for which dermatologists are famous, but without classification thoughts cannot be orderly. It must be discussed. The only phase of such a classification on which I will venture here is the one affecting the biologist. It concerns the term "epidermophytosis," as follows.

It has already been indicated that the logical classification of disease is etiologic, for while it is not absolutely fixed, there is not any other feature of a disease which is as fixed, as unchanging, as its cause. If there is any one feature for which one gropes more than any other in attempting to make a diagnosis, it is the cause. And by the same token, the ideal clinical designation of a disease will likewise be one which reflects its cause. Thus, there are bilharziasis, blastomycosis, leishmaniosis, microsporosis, trichophytosis. This is as it should be,

and it is natural that, conversely, the moment one speaks of a disease the etymology of which is connected with some well known causative agent, the mind should at once turn to that agent as being connected with it. This is the crux of the matter of nomenclature in regard to epidermophytosis, and with this understanding, I am inclined to look on the designation "epidermophytosis" as pertaining only to those cases of ringworm in which a member of the genus *Epidermophyton* is causative.

An escape from this by an attempt to include all of the fungi which inhabit the epiderm as of the genus *Epidermophyton* would be an infringement of the laws which obtain among biologists, until the rearrangement had been made in a formal, systematic, biologic manner. That is, it is true that taxonomic regulations permit the rearrangement of diverse species into different or new genera (such as *Epidermophyton*); but it can at once be added that the situation botanically with dermatologic species is not such as as to permit a rearrangement of this kind. There is no consonance between the morphology of the different fungus species and the type of lesions produced. But whatever the original reasons may have been for the designation "epidermophytosis," there remains today an inconsistency between this clinical designation and a preoccupied botanic one; my personal feeling is that the term should be relinquished in favor of some other.

What, for instance? In the absence of definite knowledge as to the precise species concerned in a given clinical case, it would still be proper to employ the plain term ringworm—"ringworm of the toes," "ringworm of the thighs" or, in the case of generalized infections, "generalized diffuse ringworm" or "dermatophytosis." The "epidermomycosis" of the French is expressive and beyond criticism.

One of the most extreme illustrations of inconsistency, at least as based on these principles, is the title of Dubrueilh and Joulia's [3] article, "A New Form of Epidermophyton Infection Due to a Yeast."

ETIOLOGY: THE PREDISPOSING CAUSES

Localization of Toe Ringworm.—This refers to the peculiar way in which the fourth interdigit of the foot is so consistently selected for the effects of this form of ringworm. It is almost uncanny that, of four interdigits available, this is the one so unerringly selected, and the same selective habit holds good for erosio interdigitalis of the fingers. As a rule, peculiarities of this sort find their explanation in, or at least are ascribed to, peculiarities and requirements of the micro-organism, and there the demand for further explanation stops. Thus, in tinea cruris, it is surmised that *Epidermophyton inguinale* finds a favorable habitat in this position because it is warm and moist. In the case of

3. Dubrueilh and Joulia: Ann. de dermat. et syph. **6**:145 (April) 1922.

the toes, however, it is difficult to imagine in what respect the first, second or third interdigits differ from the fourth. Apparently it cannot be a matter of difference in temperature, cleanliness or moisture. At first sight, one is tempted to add that the chemical composition of the sweat in these parts likewise cannot differ, but it must be realized that this is not quite true. The chemical composition of the sweat varies in different parts of the body; by this time the apokrine and ekkrine varieties are thoroughly known to dermatologists.

My attention was called to this possibility a number of years ago by the late Dr. Allen J. Smith. He pointed out that there is a gland on the foot of ruminants which amounts to a secondary sexual character—that portions of the secretion from this gland are left in the tracks of the animal and permit identification by the animals as to sex by smelling. I have accordingly examined the fourth interdigit (thick histologic sections, more or less serial) from a number of amputated human feet in the hope of finding specialized sebaceous or other glands which might indicate that there was a phylogenetic peculiarity of the glands in this position that might supply a peculiarly favorable secretion for the development of ringworm fungi. I have been utterly unsuccessful in this (morphologic) effort. However, further tests should be applied for the purpose of discovering other differences (physiologic, chemical, etc.) between the fourth and the other interdigits, for by discovering some such peculiarity a lead may be gained toward therapeusis. This concept will not appear as extreme after referring to Meirowsky and Leven's [4] lengthy communication "Tierzeichnung, Menschenscheckdung und Systematization der Muttermäler," a contribution to the comparative morphology of the skin.

Hyperhidrosis.—The predisposing effects of hyperhidrosis are now generally admitted; this advance has come from the clinical direction. Inviting though it is, I have not found that the laboratory has inquired into the situation. Schramek [5] alone stands out against it on the basis of fifty-five patients examined, twenty-one of whom were free of hyperhidrosis. Von Graffenried [6] was unable experimentally to inoculate patients with *Trichophyton pedis* until he had produced maceration of the skin and maintained it for some time thereafter.

EXCITING CAUSES

Bacteria.—It would be idle to deny that bacteria play any part whatever in ringworm of the toes, in which the lesions bear such a close

4. Meirowsky and Leven, L.: Arch. f. Dermat. u. Syph. **134**:1, 1921.
5. Schramek, M.: Arch. f. Dermat. u. Syph. **12**:630, 1916.
6. Von Graffenried, C.: Dermat. Wchnschr. **6**:361 (May 25) 1918.

resemblance to eczematoid dermatitis. In this locality, bacteria are ubiquitous; there are moisture and warmth such as obtain in ringworm of the toes and inevitable breaks of continuity of intertriginous situations. The real question is, "How commonly are bacteria the primary and sole agents?"

As a matter of fact, there is abundant evidence already that pyogenic bacteria are at least present here. Castellani (1919) stated that he found streptococci often in the "mango-toe" of Ceylon and "foot-tetter" of China, in both of which *Epidermophyton cruris* is the cause. Several years ago Sabouraud [7] established the presence of streptococci in intertrigos, and postulated a special clinical variety for such cases; i. e., his dry form of intertrigo. Furthermore, every dermatologist who has

TABLE 1.—*Bacterial Flora—Ringworm of Toes, Negative for Fungi (Twenty-Four Strains* of Staphylococci)*

A. Hemolytic strains, 2. (a) Discrete; produced alkali in milk. (b) Confluent; produced acid in milk.
B. Nonhemolytic strains, 22.

	Bouillon			Litmus Milk				
Strain	Pellicle	Sediment	Turbidity	Alkalinity	Acidity	Liquefaction	Coagulation	Number of Strains
(a) Agar colonies discrete								
1	0	+	0	++++	0	++	+	2
2	++	++	++	++++	0	++	+	3
3	0	+	0	0	++	++++	+++	2
(b) Agar colonies confluent								
1	+++	++	0	++++	0	++	+	6
2	++	+++	++	++	0	++++	0	6
3	+++	+	+	0	++	++++	+	3

* It would be proper to proceed further and determine the permanence of these different biologic characters and add other characters which might serve to get more accurate identification. However, the end-results would not be of any avail for the present purposes, inasmuch as the original purpose of the tests was to discover any strains which were constantly present in feet affected with ringworm; and this short study has been sufficiently complete to show that there is not any such strain or strains; i. e., there is a great variety of strains, not less than eight, and probably more, which overlap in their biologic characters.

essayed the culture of interdigital fungi recalls the numerous colonies of cocci which he encountered so often. Dubrueilh,[8] while countering Sabouraud's contention that yeasts did not cause intertrigo, reported that streptococci were rare in the crural intertrigos, but frequent behind the ears. "While this established the presence of bacteria, it did not prove their pathogenicity."

Hulsey and Jordan [9] gave exact figures concerning the bacteria which accompanied fungi as well as of those occurring apart from them in cases which clinically were good for ringworm of the toes. Twenty-three

7. Sabouraud, R.: Ann. de dermat. et syph. **1**:289, 1910; **4**:425, 1923.
8. Dubrueilh, W.: Ann. de dermat. et syph. **5**:65 (Feb.) 1924.
9. Hulsey, S. H., and Jordan, F. M.: Am. J. M. Sc. **169**:267 (Feb.) 1925.

strains of micrococci were obtained from seventy-seven persons who had clinical ringworm of the feet, and the count would certainly have been larger had mediums additional to Sabouraud's been employed.

Dr. Cleveland J. White, in my laboratory, then went somewhat farther by showing that at least eight different strains of the white coccus were represented in twenty-four colonies obtained from toe intertrigos which were free from fungi, of which two were hemolytic.

The groups in table 1 were constructed on the basis of only a few factors; it is probable that additional groups would be uncovered if the number of culture mediums was increased. However, this would have no practical value, short of inoculation tests on human volunteers. While White's work failed in its original purpose of detecting a single etiologic coccus and thus does not allow us accurately to classify the different clinical intertrigos from a strictly etiologic standpoint, it demonstrates sufficiently that several, and probably many, different bacterial strains must be investigated, and that one of the handicaps which has been struggled with in the mycologic field, i. e., an interweaving interrelationship between different strains, also obtains here in the bacteriologic realm.

I am aware of but one attempt to test directly the rôle of bacteria in toe ringworm (Shelmire [10]), such as the production of the disease by inoculation of pure culture. However, from knowledge of the habits of bacteria in general, as compared with those of fungi, and in view of the absolute failure in so many cases to demonstrate fungi, I feel that it is necessary to concede tentatively that bacteria are solely responsible for some of the cases of "ringworm" of the toes.

It may be put down as a generality, probably for all forms of ringworm disease, that it is much more difficult for fungi to obtain a footing on the skin than for bacteria. Even though there is an abrasion present to facilitate invasion, it is much less likely that ringworm shall result than a pyoderm—this in spite, too, of what is known of the presence of both yeast and fungus species on normal skin. Here the bacterial phase must rest.

Pathogenicity of "Yeast" Species in Epidermomycosis.—Yeast cells, in general, are so ubiquitous, so adaptive to circumstances, and so energetic in growth capacities, that, like bacteria, their mere presence in a moist, warm position like intertrigos and ulcers must not excite surprise. Indeed, Jessner and Kleiner [11] recovered ninety strains from

10. Shelmire, B.: Thrush Infection of Skin, Arch. Dermat. & Syph. **12**:789 (Dec.) 1925.

11. Jessner, M., and Kleiner, S.: Arch. f. Dermat. u. Syph. **149**:363, 1925.

150 normal nails. Greenbaum and Klauder [12] improved on this by grouping their strains; they found four species on normal skins which "conformed to" their pathogenic strains; they occurred on thirty-five out of 150 normal skins examined. Frei [13] reported that thrush fungi could be found as saprophytes in certain dermatoses; their presence in the lesion of an arsphenamine dermatitis, whence they had been transferred from the scalp, almost proved their saprophytism. Tommasoli [14] reported six different yeast species from normal skins, but that author's work loses value because it was not shown that any of the species was pathogenic. Greenbaum and Klauder [12] had better results; they reproduced intertrigo with one of the yeast species and thus fulfilled the postulates of Koch. Shelmire's [10] tests on himself were particularly commendable because he was the only one to run controls with bacteria. His yeast culture produced onychomycosis, whereas staphylococcal cultures from the patient did not.

This must challenge the attention and bring the realization that as with the streptococci which cause impetigo or tonsillitis, strains of blastomycetes are continuously present on normal skins, available when the proper circumstances arise to inaugurate a dermatosis. (Certain it is that conditions must be appropriate. McGlasson,[15] for instance, quoted recurrent erysipelas as a basis for eczematoid ringworm, and Petges [16] specifically mentioned arthritis, jaundice, diabetes, hepatorenal disease and uricemia.) More and more, as one goes deeper into medical mycology, does one find oneself applying generalities to the higher fungi that have already been established for the bacteria.

There is need of a stricter adherence to Koch's postulates all along the line in ringworm work. True, the frequent occurrence of a given species in a given type of lesion properly points the finger at it as the causative factor, but it does not finally incriminate it. The bacillus of Lustgarten, *Spirochaeta refringens* and *Sarcina ventriculi* are horrible examples in point. The experience of the Brazilians is another example; in regard to sporotrichosis they have been distubred as to diagnosis by the presence of sporotrichums in ulcerous gummas of the scalp and elsewhere in syphilitic patients. They were probably secondary invaders. Now that it is known that sporotrichums and blastomycetes may be present in epidermomycoses around the groin, without

12. Greenbaum, S. S., and Klauder, J. V.: Yeast Infections of Skin, Arch. Dermat. & Syph. **5**:332 (March) 1922.

13. Frei, W.: Arch. f. Dermat. u. Syph. **129**:404, 1921.

14. Tommasoli: Monatsh. f. prakt. Dermat. **9**:49, 1889.

15. McGlasson, I. L.: Recurrent Erysipelas of the Legs with Dermatitis of the Feet, Arch. Dermat. & Syph. **14**:679 (Dec.) 1926.

16. Petges, G.: Paris méd. **47**:249 (March 17) 1923.

any associated deep lesions, it must be recognized that species of such are not always the deeply invasive pathogens formerly supposed.

Sabouraud [7] alone seems to oppose the concept that blastomycetes may cause intertrigos. In his paper he recognized bacterial and mycotic intertrigos, declared that he had never encountered "Epidermophytosis à levures," and began a polemic with Dubrueilh and Joulia.[3] He remarked, "How easy it is to make two or three cultures, to obtain two or three colonies of the same yeast and to declare the cause." Sabouraud was correct as far as he went, but the reproduction of the disease by yeast inoculations (which will be described later) was a step farther, and must bring the profession to a different conclusion than Sabouraud's.

After the foregoing indictment comes the incrimination (including both the hyphomycetes and blastomycetes group). The case here is clearer than with the bacteria because numerous pieces of direct evidence are available—indeed, nothing short of the complete fulfillment of Koch's postulates. The experimental reproduction of fungus disease in the latter connection is particularly welcome information in the face of the knowledge that, like the blastomycetes just cited, pathogenic hyphomycetes have also been recovered from normal skins; without that information it would have to be conceded that the named "pathogens" had been erroneously classified and that they might be but commensals. Thus, Schramek [5] found mycelium on the sound skin in the neighborhood of foot ringworm—fungus could be found, at times, over an area ten times the size of the lesion. Of course, this may have been only a matter of passive transfer of fungus. Williams [17] found *Trichophyton lacticolor* once (and *Epidermophyton cruris* questionably) on normal skins (thirty-six examined), and Cornbleet [18] has just reported *E. cruris* and *Microsporon audouini* once each in scrapings from between normal toes (100 examined). It is true that Burgess [19] did not find any fungi in cultures from between 100 normal toes, but positive results always take precedence over negative ones.

It next remains to record the list of successful human inoculations. Most of these were isolated tests. Kauffman-Wolff [20] induced erosio interdigitalis on her own hand with "thrush" cultures from a patient with the disease. Berendsen [21] met success in seven out of eight human

17. Williams, C. M.: Diagnosis of Some Eruptions on Hands and Feet, Arch. Dermat. & Syph. **5**:161 (Feb.) 1922.

18. Cornbleet, T.: Cultures from the Skin of Apparently Normal Feet, Arch. Dermat. & Syph. **13**:670 (May) 1926.

19. Burgess, J. F.: Fungus Infections of the Skin; Cultural Study of Flora of Ringworm, Arch. Dermat. & Syph. **12**:853 (Dec.) 1925.

20. Kauffman-Wolff, M.: Dermat. Ztschr. **21**:385, 1914; **22**:441, 1915.

21. Berendsen, I.: Arch. f. Dermat. u. Syph. **126**:751, 1918-1919.

inoculations (intradermal), and Staehli [22] on at least four patients (skin macerated and sandpapered). Greenbaum and Klauder [12] produced the same disease with a cryptococcus culture, and simultaneously established the pathologic rôle of one of the blastomycetes which may be found between the toes. In Italy, both Marengo [23] and Zingale [24] have reproduced interdigital blastomycosis. Shelmire [10] has already been cited as producing an acute onychomycosis on himself with yeast cultures, properly controlled by bacterial inoculations, which were negative. Alexander [25] reproduced interdigital eczema with "soor" cultures, but did not regard the results as good for erosio interdigitalis. Bloch [26] related how he had produced the elementary lesions of dyshidrosis on himself by inoculating fungus cultures. Priestley [27] established *Trichophyton rubidum* among the pathogens by producing a pustular patch of ringworm with it on a human being, and DeSilva [28] further incriminated it by similarly successful inoculation on human skin. *Trichophyton pedis,* which may be identical with *Trichophyton interdigitale,* and certainly is a close relative to it, was convicted by von Graffenried [6] when he successfully inoculated two human subjects. Dold [29] reproduced ringworm on his own foot and on that of a Chinese with *Epidermophyton cruris* cultures, and I have similarly succeeded in infecting my own toes interdigitally.

This is of true interest, no less than four and probably more different species being established as pathogens. But all were isolated tests, and it remained for Jessner and Kleiner [11] to examine the situation on a large scale. Working with various blastomycetes (Soorpilze) obtained from normal skins, they inoculated eighteen patients between the fingers in various ways—on sound skin, macerated skin, lacerated skin, and "macerated and lacerated" skin. The results were negative on sound skin, but under the remaining conditions they obtained up to 40 per cent of positive results (erosio interdigitalis). This is the form which really constructive work in fungus disease must take until there is a sounder botanical foundation for cultural studies; i. e., tests on (preferably human) skin, although the use of patients may well be questioned in favor of volunteers.

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22. Staehli, E.: Arch. f. Dermat. u. Syph. **134**:407, 1921.
23. Marengo, G.: Arch. ital. dermat. sifil. e. ven. **1**:464 (May) 1926.
24. Zingale, M.: Gior. ital. d. mal. ven. **64**:929 (Aug.) 1923.
25. Alexander: Arch. f. Dermat. u. Syph. **138**:410, 1922.
26. Bloch, in discussion of Petges, G.: Presse méd. **30**:559 (July 1) 1922.
27. Priestley, H.: M. J. Australia **2**:471 (Dec.) 1917.
28. De Silva, R.: J. Trop. Med. **24**:303 (Dec.) 1921.
29. Dold, H.: China M. J. **34**:34 (Jan.) 1920; **33**:133, 1919.

The "bacteria versus fungus" question must force itself on dermatologists in those numerous cases of toe ringworm in which it has been impossible to demonstrate fungi, either microscopically or culturally. Some of these cases, it is true, are solved after repeated attempts at identifying fungus, but even after this there is still a residue of "fungus negatives." Are all of these coccogenous, or are some of them still fungal?

At this point the realm of pure speculation is entered. It may be possible that some structural forms of fungus are present in the scrapings, which are unidentifiable by the present laboratory means, and yet may subsequently develop mycelia, etc., when favorable circumstances supervene. This must be proved, but I am certain that this is the case for *Coccidioides immitis* and some of the organisms of blastomycosis; a specific stain is much needed for fungus substance in this connection. It is perhaps more likely that in such cases the fungus has died out, except for one or two scattered foci which escaped the examiner when he was procuring material. Thus, those who have studied large cultures in test tubes are aware how variable different portions of some old cultures are as to viability; plantings from the periphery of such a colony may (even when spores are present) not result in growth, whereas with material from the center the experiment may be regularly successful. Thus, the crabgrass which grows so luxuriantly in some lawns largely dies out during the winter, and it would entail much labor, with scant chance of success, for one to scrape up a few areas indiscriminately and expect to grow plants in the hothouse. But when spring comes, vigorous specimens will crop up in various places to perpetuate the species and remind one how hard it is to cope with natural processes. The same order of processes, doubtless, also occurs on the skin. It is my personal feeling that both of the foregoing conditions exist to prevent positive laboratory observations in all of the clinical cases; I do not believe, however, that they constitute the entire answer. As stated previously, on general principles—that is, from what we already know of the capacity of many different agents to produce the same kind of a clinical reaction, bacteria particularly—I believe that it would be unjustified in the present state of knowledge to deny the possibility that bacteria are the cause of some of the cases of interdigital dermatitis.

Finally, it should be recalled that vesicles and scaliness may appear on the palms independently of vital agents—as expressions not only of true dysidrosis but also of local irritants like alcohol and formaldehyde. Physicians' hands are liable to disturbances of this kind, of a milder character than that which is seen in frank dermatitis venenata

and which may erroneously be ascribed to fungi. I have had personal experience along these lines, and have checked up by purposely applying alcohol to my fingers and observing the development of mildly inflammatory, scaly patches, similar to those of ringworm.

Chiropodists.—Judging from one of the most recent textbooks, "Practical Chiropody," the chiropodists are unaware of any relation between soft corns and ringworm. In this book, a 164 page treatise, Runting [30] does not use the word "ringworm" in his discussion of corns.

EXPERIMENTAL TOE RINGWORM (PERSONAL EXPERIENCE)

Culture of Saprophyte.—A pure culture of green aspergillus which had contaminated one of the toe cultures was placed between the second and third toe. Within two weeks the skin surface had become macerated and crumbly, but was not inflammatory. It resembled a noninfectious maceration such as occurs commonly in interdigital positions. An abundance of mycelium could be found microscopically in the scrapings. At the end of two weeks' time, cultures did not yield any fungus, only white and yellow cocci. There was now a small collar of loosened epiderm around the area. After two months, there was not any trace whatever of disturbance.

Epidermophyton Cruris Infection.—Culture material was confined to the interdigit by encasing the two toes with cotton and adhesive plaster. Within twelve days a bleb had developed with a thick, opaque, white roof. The stratum of fluid in it was thin; it reeked in fungus elements, and cultures of *Epidermophyton cruris* were recovered. At the end of three weeks the epiderm separated, leaving an erythematous and oozing base. The lesions had now spread to the digito-plantar furrows. Farther than this I could not properly trace the course of this condition as a pure experimental infection with *E. cruris,* because at this juncture a culture of a saprophytic yeast was applied in connection with attempts at rational therapeusis. In the course of three or four months the infection had entirely healed and has never recurred, and *E. cruris* cannot be recovered from the site. These two experiments, however, suffice to show, even though they are not as extensive as might be desired, that there is a definite difference in the pathogenic powers of the two kinds of fungi. In the case of the green aspergillus, there was a transient, superficial hyperplasia of the epiderm, such as might be expected in connection with an agent which was producing only a mechanical effect, or perhaps a mild grade of dermatitis venenata in a

30. Runting, E. G. V.: Practical Chiropody, London, Scientific Press, 1925.

macerated position.[31] In the case of *E. cruris,* a definite inflammation was induced, with the production of classic ringworm of the toes.

Two years later the experiment was repeated; this time the culture of *E. cruris* was placed in two, instead of in one, interdigits, one of which was that which had been infected as here described. The third adjacent interdigit was not inoculated, and was left bound separately from the other two as a control. In fourteen days, a large thick-roofed bleb developed at the site of the old lesion—nowhere else. In three weeks more it completely involuted, without treatment. Erythema was not present at any stage. This experiment confirms the previous one as to pathogenicity of *E. cruris* (particularly as the culture employed had become pleomorphic in places) and eliminates the rôle of simple maceration and bacteria in causation. It disagrees with Greenbaum's [32] animal work in regard to "local immunity" to fungus infection.

The incubation period of *E. cruris* may be placed at about twelve days.

GEOGRAPHIC DISTRIBUTION OF FUNGUS SPECIES

In his paper of 1924, Hazen [33] stated, among other things, that it would be advantageous to conduct a survey of the ringworm situation in different parts of the United States, and Mitchell [34] went further, venturing that a bird's eye view was needed of the flora of the world. As a matter of fact, work along this line has been going on in my laboratory for several years. Mrs. Virginia C. Brogdon of Birmingham, Ala., has been studying more that fifty strains coming from the laboratories of Dr. Andrew L. Glaze and other physicians of Birmingham. Dr. Jeffrey C. Michael of Houston, Texas, Dr. I. L. McGlasson of San Antonio, Texas, Dr. J. Richard Allison of Columbia, S. C., Dr. J. Howard Morrow of San Francisco, Calif., and Dr. W. R. Jaffrey of Hamilton, Ontario, have also contributed materials, the value of which is sincerely acknowledged. The result of this survey, together with additions from the literature, appears, in tables 2 and 3.

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31. In this light Jessner and Kleiner's work deserves reexamination because they did not employ controls; it appears that none of the parts was subjected to bandaging and maceration alone. Under the latter circumstances, the same kind of a rapidly healing lesion might develop (as did on my toe at the aspergillus plant) as did on their "thrush" inoculation.

32. Greenbaum, S. S.: Immunity in Ringworm Infections, Arch. Dermat. & Syph. **10**:279 (Sept.) 1924.

33. Hazen, H. H.: Eczematoid Ringworm, J. A. M. A. **83**:1123 (Oct. 11) 1924.

34. Mitchell, J. H.: Further Studies on Ringworm of Hands and Feet, Arch. Dermat. & Syph. **5**:174 (Feb.) 1922.

TABLE 2.—*Geographic Distribution*

UNITED STATES AND CANADA

City	Location of Infection	Organism	No. Cases
Montreal	Toes	E. cruris	3
		Tr. interdigitale	3
		Tr. asteroides	2
		Tr. granulosum	2
		Unidentified	1
Hamilton, Ontario	Toes	Tr. interdigitale	1
Boston	Hands	Tr. (sp.?)	12
	Toes	E. cruris	5
	Generalized	Microsporon	1
New York	Toes and sole	E. cruris	3
		Tr. lacticolor	2
		Tr. acuminatum	1
		Tr. plicatile	1
		Tr. asteroides	1
		Tr. amethysticum	1
		Tr. violaceum	1
Philadelphia	Toes	Tr. interdigitale (estimated)	24
		E. cruris	3
		Tr. acuminatum	1
	T. cruris	E. cruris	6
	Groin, face, scalp, mouth, toes	O. albicans (case of thrush)	1
Chicago	Feet	E. cruris	22
	Feet	Tr. interdigitale	43
	Feet	Yeast	3
	Feet	E. cruris (?)	1
	Feet and groin	E. cruris	1
	Groin and axilla, neck, hand	E. cruris	1
	Finger	O. albicans	1
St. Louis	Finger	O. albicans	1
	Groin (T. cruris)	Monilia or Oidium	1
San Francisco	Toes	Tr. gypseum	7
		E. cruris	4
		Yeast	1
		Unidentified	1
San Antonio, Texas	Hands and feet	Tr. interdigitale	4
		Sporotrichum schenki	1
		Tr. gypseum	1
		Tr. rubrum	1
Houston, Texas	Toes	Tr. interdigitale	14
		Tr. gypseum	2
		Tr. rubrum	2
		E. cruris	2
Dallas, Texas	Nails	O. albicans	5
Columbia, S. C.	Toes	Tr. interdigitale	2
		Tr. rubrum	2
		Tr. gypseum	1
Birmingham, Ala.	Toes	Tr. interdigitale	49
		Tr. rubrum	12
		Tr. gypseum	6
		Tr. pedis	3
		E. cruris	3
			272

Summary of American Species

Tr. interdigitale	140	Tr. acuminatum	2
E. cruris	54	Tr. granulosum	2
Unidentified	20	Tr. lacticolor	2
Tr. rubrum	17	Tr. plicatile	1
Tr. gypseum	17	Tr. amethysticum	1
O. albicans	8	Tr. violaceum	1
Tr. asteroides	3	Sp. schenkii	1
Tr. pedis	3		
Total			272

TABLE 2.—*Geographic Distribution—Continued*

ENGLAND

Location of Infection	Organism	No. Cases
Anus	E. cruris	10
	rubrum	2
Feet	E. cruris	10
	Tr. crateriforme	2
	Helminthosporium (?)	1
	Tr. gypseum	1
	Tr. violaceum (?)	1
Axilla	E. cruris	8
Groin	Tr. crateriforme	1
Arms	Tr. sp (?)	1
Hand	Tr. crateriforme	3
	persicolor	1
	violaceum	1
Vulva	E. cruris	1
Trunk	Cr. epidermidis	Frequent

Summary of English Species

E. cruris	29
Tr. crateriforme	6
Scattering	8
Total	43

FRANCE

		No. or %
Intertrigo (toe and otherwise)	E. cruris	80%
Dyshidrosis	E. cruris	23 cases
Eczema marginatum (legs and trunk)	E. cruris	2 cases
General, psoriasiform; Tinea cruris	Tr. granulosum (single epidemic)	100 cases
Glabrous skin of children; plaques single and multiple	M. audouini	13 cases
Dyshidrosis	E. ota (Tr. pedis ?)	6 cases
Generalized	Tr. rubrum	4 cases
Universal eczema	Sporotrichum beurmanni	1 case
Axilla, groin, thence generalized	Favre's yeast (Cryptococcus)	1 case
Toes and sole	Cr. jeanselmei (Debaryomyces, according to Ota)	1 case
Dyshidrosis	Tr. pedis	1 case
	Tr. gypseum	1 case
Seborrheic eczema (eyebrows, lids and forehead	Tr. gypseum asteroides	Several
Keratotic form of Dubreuilh	Cr. mymecial	(?) probably many
Intertrigo (toe and otherwise)	Tr. rubrum	% (?)
Palms and soles	Tr. violaceum	% (?)
	acuminatum	% (?)
	M. audouini	% (?)
	Tr. granulosum	% (?)
	asteroides	% (?)
Back of hands (kerion-like)	Tr. gypseum	% (?)
	niveum	% (?)
Legs	Oidium (?)	2 cases
Groin	Oidium (?)	1 case
Neck and hand	Tr. violaceum	1 case
Anus	Tr. niveum radians	1 case
Groin	O. albicans	1 case
Scalp, buttocks, arms	Tr. acuminatum	1 case

Summary of French Species

E. cruris predominant by a wide margin.
Remaining species widely scattered.
Tr. interdigitale apparently unknown until recently (Ota's Tr. Pedis).

GERMANY

		No. Cases
Toes	*Tr. interdigitale	17
	*E. cruris	2
	*M. lanosum	1
	*A. quinckeanum	1
	*Tr. gypseum	1
	Debaryomyces fabrii	1
	Tr. tremoniensis	1
Hands and feet	Tr. interdigitale	13
	E. cruris	2
	Tr. pedis	2
Groin	†E. cruris	11
Trunk, extremities	E. cruris	11
Groin, axilla, etc	E. cruris	9
Genitalia and buttocks	Oidium albicans	8
Back and shoulders	Tr. asteroides	1

* Pro parte, cases from Berlin, Paris and Vienna. Not reported in a form permitting accurate geographic distribution.
† "Many" in addition reported by Lewandowsky.

TABLE 2.—*Geographic Distribution—Continued*

MANCHURIA AND JAPAN

Manchuria	Dyshidrosis	Tr. pedis	4
	Herpes circine (scapula, neck, fingers and toes)	E. rubrum	4
	T. cruris	E. rubrum	1
Tokio	Groin, waistline and elsewhere	E. rubrum	58
	Dyshidrotic eczema and interdigital trichophytosis	Tr. interdigitale	18
	Groin, waistline and elsewhere	Tr. gypseum	5
	Groin, waistline and elsewhere	E. cruris	3
	T. cruris	E. rubrum	3
(?)	Mycotic dyshidrosis	Tr. gypseum var. 3 (interdigitale [?])	3
	Mycotic dyshidrosis	Tr. gypseum var. 4 (interdigitale [?])	3
	Mycotic dyshidrosis	E. cruris	2
	Mycotic dyshidrosis	Tr. asteroides	1
Unclassified on account of pleomorphism			12
			117

Summary of Japanese Cases

E. rubrum	66
Tr. interdigitale	24
E. cruris	5
Tr. gypseum	5
Tr. pedis	4
Tr. asteroides	1
Unclassified	12
	117

CHINA

Location of Infection	Organism	No. Cases
Feet	E. cruris	11
	Unidentified	3
		14

CEYLON

Buttocks	E. rubrum	1
Toes	*E. cruris (?)	?
Groin	*E. cruris	Common

AUSTRALIA

Toes	Tr. interdigitale	2
Groin	Tr. interdigitale	1
Buttocks	Tr. rubidum	1
Leg	M. scorteum	1

ITALY

Hands	Yeast (?)	2
	O. albicans	1

AUSTRIA

Face, chest	Tr. violaceum	2

HOLLAND

Wrist	Tr. eriotrephon	1

BRAZIL

Dyshidrosis	Tr. rubrum seu purpureum	Frequent

* Not stated in a form to indicate whether species was determined by culture.

TABLE 3.—*Catalog of Fungus Species in Epidermomycosis*

Observers	Place	Location of Infection	Organism	No. or % of Cases
1910				
Bang: Ann. de dermat. et syph. **1**: 229, 1910	France	Generalized	Tr. rubrum	4

TABLE 3.—*Catalog of Fungus Species in Epidermomycosis—Continued*

Observers	Place	Location of Infection	Organism	No. or % of Cases
1910-1911				
Sabouraud: Brit. J. Dermat. **23**: 384 (Dec.) 1911	Paris	Intertrigo	E. cruris	80%
		Intertrigo	Tr. rubrum	% ?
		Palms and soles	Tr. violaceum	Most common
			Tr. acuminatum	% ?
			M. audouini	% ?
			Tr. granulosum	% ?
			Tr. asteroides	% ?
		Back of hands	Tr. gypseum	% ?
			Tr. niveum	% ?
Whitfield: Brit. J. Dermat. **23**: 39 (Feb.) 1911; **23**: 375 (Dec.) 1911	England	Foot	E. cruris	3
		Groin	Tr. crateriforme	1
		Foot	Helminthosporium ?	1
Pringle: Brit. J. Dermat. **23**: 394 (Dec.) 1911	England	Axilla	E. cruris	8
Adamson: Brit. J. Dermat. **23**: 397 (Dec.) 1911; **23**: 224, 1911	England	Palm	Tr. persicolor	1
		Fingers	Tr. violaceum	1
		Palm	Tr. crateriforme	1
		Toes	E. cruris	6
		Foot	Tr. gypseum	1
Bolam: Brit. J. Dermat. **23**: 400 (Dec.) 1911	England	Toes	E. cruris	1
			Tr. crateriforme	2
Bunch: Brit. J. Dermat. **23**: 398 (Dec.) 1911	England	Foot	Tr. violaceum ?	1
1914				
Montgomery and Culver: J. A. M. A. **62**: 1076 (April 4) 1914	.....	Toes and foot	E. cruris	1
Kauffman-Wolff: Dermat. Ztschr. **21**: 385, 1914; **22**: 441, 1915	Berlin, Vienna, Paris	Feet	Tr. interdigitale ?	17
			E. cruris	2
			M. lanosum	1
			A. quinckeanum	1
			Tr. gypseum	1
1915				
Fischer: Berl. klin. Wchnschr. **52**: 241, 1915	.....	Groin, axilla, etc.	E. cruris	11
		Groin	E. cruris	9
		Trunk and extremities	E. cruris	9
Gougerot and Gancea: Bull. Soc. franç. de dermat. et syph. **25**: 335 (July 2) 1914	.....	Groin	O. albicans (?)	1
Schamberg: Arch. Pediat. **32**: 617, 1915. Illustration in Sutton: Diseases of the Skin, ed. 6, St. Louis, C. V. Mosby Company, 1926, p. 1187	Philadelphia	Groin Face Scalp Mouth	O. albicans (case of infantile thrush)	1
1916				
Ormsby, O. S., and Mitchell, J. H.: J. A. M. A. **67**: 711 (Sept. 2) 1916	Chicago	Foot	E. cruris	4
		Feet	Tr. (interdigitale [?])	4
		Feet	Tr. (interdigitale [?])	3
		Feet	Yeast	3
		Feet	E. cruris	1
		Feet and groin	E. cruris	1
		Groin, axilla, neck and hand	E. cruris	1
Lewandowsky: Arch. f. Dermat. u. Syph. **121**: 531, 1916	Germany	Groin	E. cruris	Many
		Groin and toes	E. cruris	Many
		Toes and feet only	E. cruris	2
Saphier: Arch. f. Dermit. u. Syph. **122**: 626, 1916	Germany	Foot	Tr. gypseum	1
1917				
Priestley: M. J. Australia **2**: 471 (Dec.) 1917	Sydney, Australia	Toes	Tr. interdigitale	2
		Groin	Tr. interdigitale	1
		Buttocks	Tr. rubidum	1
		Leg	M. scorteum	1
1918				
Muijs: Dermat. Wchnschr. **66**: 65 (Feb.) 1918	Germany	Groin and buttock	O. albicans	8
Von Graffenried, C.: Dermat. Wchnschr. **6**: 361 (May 25) 1918	Germany	Hands and feet	Tr. pedis (?)	2

TABLE 3.—*Catalog of Fungus Species in Epidermomycosis—Continued*

Observers	Place	Location of Infection	Organism	No. or % of Cases
1919				
Castellani: Manual of Tropical Medicine, ed. 3, New York, William Wood & Co., 1919, p. 2036	Ceylon	Toes	E. cruris	?
Dold, H.: China M. J. **34**: 34 (Jan.) 1920; **33**: 133, 1919	Shanghai	Feet	E. cruris	11
		Feet	Unidentified	3
Pautrier: Ann. de dermat. et syph. **7**: 278 (Sept.) 1919	Strasbourg	Eczema marginatum (legs and trunk)	E. cruris	2
1920				
Castellani J. Trop. Med. **23**: 134 (June) 1920	.....	Arms and trunk	Cr. epidermidis	Frequent
Engman: Arch. Dermat. & Syph. **1**: 370 (April) 1920	St. Louis	Grain (T. cruris)	Monilia or Oidium	1
Tanner, F. W., and Feuer, B.: Arch. Dermat. & Syph. **1**: 365 (April) 1920	St. Louis	Finger	O. albicans	1
1921				
Gravagna: Ann. de dermat. et syph. **2**: 489, 1921	France	Neck and hand	Tr. violaceum	1
Spaar: J. Trop. Med. **24**: 126 (May 2) 1921	.....	Buttocks	E. rubrum	1
White and Greenwood: J. A. M. A. **77**: 1297 (Oct. 22) 1921	Boston	Hands	Tr. (?)	12
		Toes	E. cruris	5
1922				
Alexander: Med. Klin. **18**: 1550 (Dec. 3) 1922	.....	Hands and feet	Tr. interdigitale	13
Burnier and Langeron (?), in Petges, G.: Presse méd. **30**: 559 (July 1) 1922	Paris	Toes and sole	Cr. jeanselmei (Debaryomyces, according to Ota)	1
Dubrueilh and Petges in Petges, G.: Presse méd. **30**: 559 (July 1) 1922	France	Universal eczema	Sporotrichum beurmanni	1
Mitchell: Arch. Dermat. & Syph. **5**: 174 (Feb.) 1922	.....	Toes	Tr. interdigitale	36
Horta, in Petges, G.: Presse méd. **30**: 559 (July 1) 1922	Rio de Janeiro	Dyshidrosis	Tr. rubrum seu purpureum	Frequent
			E. cruris	18
Montlaur and Dumet, in Petges, G.: Presse méd. **30**: 559 (July 1) 1922	.....	T. cruris	E. rubrum	1
Ota and Kawasaki: Japan Ztschr. f. Dermat. u. Urol. **22**, September, 1922	Tokio	Groins	E. rubrum	56
Ota: Arch. Dermat. & Syph. **5**: 693 (June) 1922	Tokio	Dyshidrotic eczema and interdigital trichophytosis	Tr. interdigitale	18
Ota and Kawasaki: see above	Tokio	Waistline and elsewhere	Tr. gypseum	5
Ota and Kawasaki: see above	Tokio	Waistline and elsewhere	E. cruris	3
Ota: see above	Tokio	T. cruris	E. rubrum	3
		Groins and elsewhere	E. rubrum	2
		?	E. cruris	2
		?	Tr. asteroides	1
		Unclassified on account of pleomorphism		12
Ota: Bull. Soc. de path. exot. **15**: 594 (July) 1922	Manchuria	Toes	Tr. pedis	4
		Herpes circine (scapula, neck, fingers and toes)		4
Ota: see above	Paris	Tinea cruris	E. rubrum	1
Ota: see abvoe	Alabama	Toes	Tr. pedis	1
		Toes	Tr. pedis	3
Pautrier and Reitmann: Bull. Soc. franç de dermat. et syph. **29**: 98, 1922	France	Glabrous skin of children, plaques, single	M. audouini	13
Weidman: Arch. Dermat. & Syph. **5**: 325 (March) 1922	Philadelphia	T. cruris	Monilia (?)	1
		T. cruris (including anus)	Monilia	1
		T. cruris (including fingers and toes)	Monilia	1
Williams: Arch. Dermat. & Syph. **5**: 161 (Feb.) 1922	New York	Toes and sole	E. cruris	3
			T. lacticolor	2
			T. acuminatum	1
			T. plicatile	1
		Hand	T. asteroides	1
			T. amethysticum	1
			T. violaceum	1

TABLE 3.—*Catalog of Fungus Species in Epidermomycosis—Continued*

Observers	Place	Location of Infection	Organism	No. or % of Cases
1923				
Arzt and Fuhs: Dermat. Wchnschr. **76**: 409 (May 12) 1923	Vienna	Face and chest.....	T. violaceum.....	2
Du Bois: Ann. de dermat. et syph. **4**: 526 (Aug.-Sept.) 1923	.....	Anus.....	Tr. niveum radians..	1
		Keratotic form of Dubreuilh	Cr. mymecial.....	? probably many
Favre and Ota: Compt. rend. Soc. de biol. **88**: 222, 1923	.....	Axilla.....	Favre's yeast (cryptococcus)	1
Ota, M.: Ann. de parasitol. **3**: 181 (April) 1925	.....	Groin, thence generalized	Myceloblastonon favrei	1
Felix: Dermat. Wchnschr. **78**: 500 (June) 1923	Berlin	Back and shoulders....	Tr. asteroides.... ...	1
Petges: Paris méd. **13**: 249-251 (March 17) 1923	.....	Seborrheic eczema, eyebrows, lids and forehead	Tr. gypseum asteroides	Several
Zingale: Gior. ital. d. mal. ven. **64**: 929 (Aug.) 1923	Italy	Hands.....	O. albicans.....	1
			Yeast (?).....	2
1924				
Castellani: J. Trop. Med. **27**: 304 (Nov. 15) 1924	England	Anus.....	E. cruris.....	8
		Anus.....	E. rubrum...	2
			Tr. (?).....	1
		Toes.....	E. cruris.....	2
Hulsey and Jordan: Am. J. M. Sc. **169**: 267 (Feb.) 1925	Philadelphia	Toes.....	Tr. interdigitale.....	4
			E. cruris.....	1
McGlasson and Lehman: Texas State J. Med. **19**: 626 (March) 1924	San Antonio, Texas	Hands and feet.....	Sporotrichum schenki	1
Ota: Dermat. Wchnschr. **78**: 284, 1924	Germany	Toes.....	Debaryomyces fabrii	1
			D. tremoniensis.....	1
Sicoli: Ann. de dermat. et syph. **5**: 69 (Feb.) 1924	Paris	Dyshidrosis.....	E. cruris..	23
			E. ota (Tr. pedis [?])	6
Pautrier and Reitmann: Bull. Soc. franç de dermat. et syph. **31**: 29, 1924	Strasbourg	Generalized.....	Tr. granulosum.....	100
1925				
Burgess: Arch. Dermat & Syph. **12**: 853 (Dec.) 1925	Montreal	Toes.....	E. cruris.....	3
		Groin.....	Tr. interdigitale.....	3
		Sole.....	Tr. asteroides.....	2
		Axilla.....	Tr. granulosum.....	2
		Hand.....	Unidentified.....	1
Castellani: J. Trop. Med. **28**: 329 (Sept. 15) 1925	London and Ceylon	Anus.....	E. cruris.....	2
		Vulva.....	E. cruris.....	1
Frèche and Cazenave: Ann. de dermat. et syph. **6**: 341, 1925	France	Scalp, arms and buttocks	Tr. acuminatum.....	1
Glaze (previously unpublished)	Birmingham, Ala.	Toes.....	Tr. rubrum.....	25
		Hands.....	Tr. gypseum.....	15
		Generalized.....	Tr. interdigitale.....	8
			E. cruris.....	2
Shelmire: Arch. Dermat. & Syph. **12**: 789 (Dec.) 1925	Dallas, Texas	Nails (paronychia)....	O. albicans.....	5
1926				
Papegaay: Acta derm.-venereol. **7**: 1 (March) 1926	Amsterdam, Holland	Wrist.....	Tr. eriotrephon.....	1
Morrow (previously unpublished)	San Francisco	Toes.....	Tr. gypseum.....	7
			E. cruris.....	3
			Yeast.....	1
			Unidentified.....	1
Weidman (previously unpublished)	Philadelphia	Toes.....	Tr. interdigitale (estimated)	20
			E. cruris.....	2
			Tr. acuminatum.....	1

ANALYSIS OF PATHOGENIC SPECIES

These compilations are revolutionary in several ways. Doubtless the greatest surprise comes in respect to *E. cruris*. According to the reports of Sabouraud [35] and Whitfield,[36] this organism was the one to

35. Sabouraud, R.: Brit. J. Dermat. **23**:385, 1911.

36. Whitfield, A.: Brit. J. Dermat. **23**:39 (Feb.) 1911.

be expected most commonly between the toes, but Mitchell [34] remarked in 1922 that this idea was subject to revision. It now develops that *Trichophyton interdigitale* is the most common in the northern states, whereas *Trichophyton rubrum* and *interdigitale* are the commonest in the southern states, in Manchuria and in Japan. After these, there is a scattering of no less than eighteen other species, exclusive of blastomycetic species (five determined of the latter), and including even microsporons, sporotrichums and an achorion. It is necessary to expand previous notions as to the number of species causative of "Epidermophytosis." The second development is the realization that blastomycetes must not be omitted from serious consideration in intertrigo of the toes.

SUMMARY IN REGARD TO ETIOLOGY

To sum up, I believe that among the manifold cutaneous expressions which are included under the style of epidermophytosis, all three classes of micro-organisms, bacteria, blastomycetes and hyphomycetes, are causative. Some of the expressions are so characteristic, dermatologically, as to indicate the identity of the causative micro-organism, but in most cases the appearances are such as may be produced by a number of different species or even classes.

Species representing all three classes of micro-organisms have been found on normal skins, and (excepting the bacteria) have satisfactorily reproduced lesions on human skin under experimental conditions. When it has been investigated in sufficient numbers, each species appears to be cosmopolitan; but, as in the case of scalp ringworm, certain species predominate in certain countries. Species cannot be strictly aligned geographically, but there is a tendency for *E. rubrum* to occur in the warmer climates and in Japan.

The blastomycetes are assuming greater and greater importance.

DERMATOPHYTIDES

In this country, Williams [37] has been foremost in advocating the possibility of dissemination of fungus products from the major lesion, with the production of secondary eruptions elsewhere on the body. Thus, in a patient in whom the fungus was demonstrated on both the hand and the foot, there was an acute vesicular outbreak on the chest and extremities four days after Whitfield's ointment was applied. The fungus could not be found in a fresh vesicle from the dorsum of the foot. It was noted that the vesicles in the original lesion of this patient were deep, a point which I personally believe to be important in form-

37. Williams, C. M.: Lichenoid Tricophytide, Arch. Dermat. & Syph. **4**:353 (Sept.) 1921; Dermatophytid Complicating Dermatophytosis of the Glabrous Skin, ibid. **13**:661 (May) 1926.

ing an opinion as to the validity of dermatophytide. Certain it is that one should be skeptical in the case of superficial ringworm conditions such as tinea versicolor, erythrasma, etc. In the case of kerion, there is not any difficulty in understanding how a secondary fungus eruption might induce effects in a more remote part of the body.

Ringworm, as it affects the toes, is in an intermediate situation as regards superficiality; besides, with this form, great care must be exercised in drawing conclusions on a purely statistical or theoretical basis, for, statistically considered, on the one hand a form of ringworm admitted to be common is being dealt with, and on the other hand the forms which the dermatophytide may take are various. Thus it is not difficult, according to the laws of chance, for an urticarial or a scarlatiniform eruption or a toxic erythema (so many different expressions are contributory to the dermatophytide complex) to coincide with such a common condition as ringworm of the toes. All the more is this true when medication with salicylic acid complicates the situation. A dermatitis venenata-medicamentosa factor must be excluded, at least in some of the cases.

The following cases are illustrative:

CASE 1.—A patient who had had macerated epithelium between the toes for many years was submitted by Dr. Grindon[38] before his dermatologic society. Two months before, vesicles had appeared at an appendectomy scar, and subsequently others had appeared on the trunk and arms. By the time of presentation they had largely dried up. Dr. Mook diagnosed the condition as an eczematoid dermatitis. Here one sees the sane realization that an intercurrent infection may complicate ringworm in the same way that acne vulgaris may accompany syphilis.

CASE 2.—A patient with a typical tinea cruris was presented before the Chicago Dermatological Society by Dr. Zeisler.[39] In addition, there were eczematoid patches around the elbows, ankles and buttocks. It developed that Dr. Senear had had the patient in charge previously, that fungus had been demonstrated from the crural region and that after Whitfield's ointment was employed, an eczematoid condition developed on the arms and forearms. Dr. Pusey agreed that it was a superadded eczematoid condition.

CASE 3.—A case of ringworm of the toes associated with psoriasis was presented by Dr. Van Rhee.[40] There was not any dispute in the discussion which followed as to the diagnosis of psoriasis.

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38. Grindon, Joseph: A Case of Epidermophytosis with Generalized Papulovesicular Lesions, Arch. Dermat. & Syph. **9**:534 (April) 1924.

39. Zeisler, J.: Epidermophyton Infection, Arch. Dermat. & Syph. **1**:599 (May) 1920.

40. Van Rhee: Dermatophytosis and Psoriasis, Arch. Dermat. & Syph. **9**:523 (April) 1924.

It is not my intention to deny the occurrence of dermatophytide, but to urge caution lest the subject be overdone. Dermatophytides may be admitted as a concept, but the burden of proof for the individual case is on the proponent. The final proof of the frequency of valid dermatophytides, by and large, must be on other than circumstantial or quasi-statistical data—preferably by experimental tests on the patient, involving the use of both the fungus concerned and the abnormal tissue products of the disease. Only in this way can it be determined how much of the effect is referable to fungus substance, how much to secondary infection, etc.

LABORATORY DIAGNOSIS

There are two major phases to the laboratory diagnosis; first, the determination that pathogenic fungi at least are present; second, the

TABLE 4.—*Microscopic and Cultural Results; Ringworm of Toes*

Observers	Number of Cases	Fungus in Scrapings		Cultures	
		Number	Percentage	Number	Percentage
Dold, H.: China M. J. **34**: 34 (Jan.) 1920; **33**: 133, 1919	98	95	96	14	45
Hulsey and Jordan: Am. J. M. Sc. **169**: 267 (Feb.) 1925	77	49	63	5	10
Sicoli: Ann. de dermat. et syph. **5**: 69 (Feb.) 1924. Working in Sabouraud's laboratory; material confined to cases of dyshidrosis	47	47	100	29	62
White and Greenwood: J. A. M. A. **77**: 1297 (Oct. 22) 1921	..	25	50	18	40
Williams: Arch. Dermat. & Syph. **5**: 161 (Feb.) 1922	36	13	36	5	14
Kauffman-Wolff: Dermat. Ztschr. **21**: 385, 1914; **22**: 441, 1915	25	?	?	22	88

determination of the species concerned. The former is at present largely a matter of direct examination of scrapings—cultures seldom give further results when the direct examinations fail. All workers agree that often numerous examinations must be made before the fungus is finally discovered. There is no occasion to resort to refined and more or less uncertain serologic and other immunity reactions when the causative agent, as here, is available for direct observation. Avail may be made of (1) the well known alkali technic, (2) staining and (3) cultures.

A. *Direct Microscopic Examination of Scrapings in Sodium Hydroxide Solution.*—There are four categories of fungus which can be distinguished by this technic: (1) the obvious saprophyte (really a form other than one of the fungi imperfecti, generally); (2) the long seldom branching pathogen; (3) the "mosaic" fungus; (4) yeast cells.

1. The obvious saprophyte, i. e., one that is not inherent in the skin, is not encountered frequently, because it is seldom that one can, in scrapings, pass on the question of pathogenicity and exclude its possi-

bility by simple inspection. At times, though, it may be done—most commonly with material from the toes and nails. Thus, when the mycelium and spores have a scrambled arrangement, or rather, lack of arrangement; when the spores and segments are ridiculously large, peculiarly shaped, bizarre in form and general appearance; when they have a diffuse brownish or greenish color; when the immediate matrix in which they lie contains less of epidermal detritus and more of extraneous matter (dirt)—when these features are present it may be surmised that the fungus is not of the fungi imperfecti. This largely presupposes a knowledge of the fungi imperfecti as they appear in scrapings, and without it one can scarcely expect to distinguish even saprophytes under otherwise optimum conditions. It is important to be able to recognize saprophytes, not only to avoid false positives in diagnosis, but also because one may be led to stop here and thus fail to recognize the real pathogen that may also be present and recognizable.

2. Long, seldom branching mycelium is the kind which is beyond question as a pathogen and as an indicator of ringworm. I need not describe this. It is familiar to all who have examined scrapings of *E. cruris* infection of the groin.

3. The mosaic form has been questioned even as to its fungous nature. If this material is really fungous, it must be in a degenerate state, for the segments are irregularly shaped, and are separated from each other by narrower or broader, but definite, spaces; they have a moth-eaten appearance, and their edges and corners are rounded off. They do not have any organized internal structure; arthospores are not visible within the segments. But it is the *arrangement* of the mycelium that raises the question whether this is fungus—not so much that it occurs in smaller and larger patches, but that the mycelium ramifies and anastomoses around the individual epidermal cells in such a way as to suggest that air or other refractile matter had become imprisoned between the cells. These hyphae vary in width, until finally one recognizes only threadlike filaments coursing between the cells. It requires fine discrimination to come to the conclusion that these are fungous and not inert intercellular accumulations. I have applied the term "mosaic" to this form because, following as they do the intercellular clefts, the hyphae come to surround smaller and larger polyhedral spaces, which collectively give the "pavement" effect.[41] It is in con-

41. The lines of juncture of normal epidermal cells are hyaloid and greenish, and must not be mistaken for fungus structures. This can be readily done, however, with a little care. Personally, I am satisfied that this material is not air; I have dissected it free (under the microscope) from the surrounding cells, and it gives the same tinctorial reactions with Giemsa solution as fungus substance.

nection with this form that the general subject of fallacies (to be discussed immediately) is most important.

4. "Yeast" cells appear in two forms in scrapings, as more or less elongated hyphae, and as the characteristic "budders." The former are useful, of course, in that they indicate the presence of fungous materials, but when present in small quantities that are not pathognomic of yeast infection. This is the case in crural cases—in these one must recognize budding cells before declaring the case blastomycetic. Between the fingers the mycelium is notoriously abundant; closely tangled in a way that is never approached by any hyphomycetic infection. In any case, the crux in diagnosis of the yeast infections is the recognition of budding cells; this must be carefully distinguished from the subdivision of conidia as seen in the hyphomycetes.

In persistent "fungus negative" cases, I have succeeded in getting positive results in two cases after applying dextrose dressings to the part for a week. Dextrose is an optimum pabulum for fungi in general, and it is probable that it operates sufficiently, even in contact with vital tissue—to promote growth of fungus. This procedure may prove useful as a routine in all "fungus-negative" cases. The dextrose (Karo corn syrup) was used in 4 per cent solution, prepared fresh daily.

Fallacies in Microscopic Examinations: When dealing with such simply organized structures as the fungi imperfecti, qualities such as refractility, hyalineness and finer nuances of color must be depended on for identification when they become degenerate, and their segmentation, contour, etc., cannot be determined, as is so often the case in animal tissues. When the degenerate keratinous substance in the scrapings becomes fragmented, it may, being likewise hyaloid and highly refractile, so closely simulate the degenerate fragments of mycelium and spores as to be indistinguishable from them. One cannot, therefore, hope to recognize individual spores or segments, as such, in sodium hydroxide preparations. Furthermore, air, soaps and fatty substances might, at least theoretically, become imprisoned between cells and also appear in a hyaloid, pseudobranching, more or less mosaic form resembling fungous structure; it is particularly necessary for us to dispose of this possibility in connection with the "mosaic" form of fungus described previously. I regard as fungous only those cases in which the "mosaic" is abundant, definitely branching, the hyphae being continuous and the sides being parallel.

B. *A Staining Method for Extemporaneous Preparations.*—This technic is not proposed as a substitute for the long established sodium hydroxide method in which the mere presence or absence of fungus is to be determined. But in those cases in which it has been impossible to demonstrate fungus, the search for yeast cells and bacteria is in order; or, when the details of fungi are to be established, it is recom-

mended. The method involves two factors: first, the rapid clearing of the specimen, and second, the staining. Without the first, fungus could scarcely be recognized in such thick scales as are seen in hand and foot ringworm. As clearing agents, the stronger alkalis are at once excluded on account of their destructive effect on dyes, and recourse is had to glycerin. Mixtures of glycerin and saturated alcoholic solutions of various dyes were found useful, but not as much as Giemsa's stain.[42]

The technic is as simple as for the classic sodium hydroxide preparation; a minute drop of undiluted Giemsa's stain is stirred into the scrapings (specimens as thin as possible) and the coverslip applied. Heat must not be employed. In a few minutes all structures will become blue—more so in some parts of the field, less so in others. In from one to five minutes, a drop of distilled water is run under the coverslip—the drop must be a small one, for an excessive amount of fluid will thicken the stratum of mounting medium and dilute the glycerin too much, resulting in a poorly cleared preparation. Nuances of color between the red and blue will now occur, affecting both tissue elements and micro-organisms, and varying in different parts of the preparation, depending on the extent to which the water has differentiated the dye. One must accordingly select the most favorable places for study, but the color changes may later be varied at will by withdrawing some of the fluid with filter paper. The latter maneuver is valuable also as a routine because it flattens the scrapings (capillary pressure by coverslip), reduces the thickness of the mounting medium (increased visibility) and facilitates subsequent ringing of the coverslip when semipermanent preparations are desired. Yeast cells, bacteria and *Pityrosporum ovale* in scalp cases all come out conspicuously in such preparations.

The method is the one of choice for bringing out details of structure of yeast cells in culture. Here one stirs some of the solid yeast colony into a minute drop of the Giemsa solution and proceeds according to the foregoing method. This method prevents the shrinkage and distortion incident to those in which preliminary fixation (particularly by heat) of the yeast cells is required. Poor results with this method may be due to a poor sample of dye (Giemsa's stain is susceptible,

42. I have tried to improve the diagnosis of obscure cases in such a way as to clinch it by staining methods, but without success. A dye is still awaited which will specifically differentiate fungus substance from the keratin, fat and other components of the epiderm. Dr. Wilhelmina S. Scott and Dr. Theodore Cornbleet have independently essayed this in my laboratory. The more commonly used dyes, dissolved in glycerin, were applied to favus, tinea versicolor and tinea cruris materials. None of them approached Giemsa's as a specific differentiating agent.

particularly to acids), to chemicals previously applied to the lesions therapeutically or to undue thickness of the scrapings examined.

C. Cultures.—This is not the place to attempt the detailed differential diagnosis between the saprophytic and the pathogenic fungi as they appear in culture, even if it could be done as a generality; this requires experience with the pathogenic forms. Briefly, most of the saprophytes that occur in this connection are highly colored—the familiar green, brown or black forms. Since few, if any, of the pathogens are thus highly colored, such may be dismissed in the ordinary case; even *Trichophyton rosaceum* and *Trichophyton sulfureum* are but faintly colored by comparison. Fungus colonies that grow rapidly, becoming an inch in diameter within about three or four days, are probably saprophytic; also those that fill the tube with a loose, fluffy growth within five or six days. The probable pathogens are those which make their appearance within from three to seven days, grow slowly (requiring from seven to ten days before attaining a diameter of 1 inch [2.5 cm.] at the most) and remain white or at most become only yellowish white with age. They may be downy throughout their entire lifetime or become powdery at some stage; this is utterly variable, according to species.

The foregoing are generalities of the roughest sort, but more cannot be recorded here. This will be better appreciated after reading what follows in this paper; i. e., after showing that he who essays ringworm determinations should become familiar with most of the accredited pathogens.

Usefulness of cultures: What can be gained by determining the different ringworm species concerned in hand and foot cases? Of what use is it? This has often been asked in connection with forms of ringworm other than of the hands and feet. As things stand today, in practical everyday work, it is of little avail; but as instruments for the intensive and basic study of the subject in the future, such a determination means everything. The habitat of the etiologic agent in nature or elsewhere, means of transmission and dissemination (hygiene, epidemics) and the rational (chemotherapy or vital therapy) therapy, all depend on the accurate knowledge of just what is being worked with and against. It is true that these tools have not been used to any extent in the past, but this is due to difficulties in ringworm technic, and to the fact that this form of ringworm is, to the laity, so inconspicuous and misunderstood that it does not command the attention it deserves. Picture what would happen in the laboratories if this obstinate condition appeared at the angle of the mouth or the nostril instead of within the shoes. I hope to bring out in the final section of this paper that there is a promising approach to therapy through a knowledge of the fungus species concerned in the individual case.

LIMITATIONS OF DETERMINATIVE MYCOLOGY

It is proposed here to indicate some of the pitfalls in culture work, as well as allied considerations that obtain in determinative mycology. Thus far, in this paper, including its tables, I have accepted and stated everything as it appears in the literature at face value, i. e., without commenting on the sources of error which are so ubiquitous—occurrences behind the scenes in the laboratory with which the average dermatologist is unfamiliar, but which compel the laboratory worker to maintain a balanced mental reserve, just as he does toward the Wassermann reaction. Indeed, it is excusable for dermatologists to become pessimistic promptly after undertaking the culture and classification of ringworm species. It would be specious dishonesty to leave the impression that everything is as scientifically and mathematically accurate as heretofore represented in this paper; hence, some of the laboratory shortcomings will be discussed, even at the price of anticlimax.

In the first place, there are shortcomings as to culture mediums. On these I shall not dwell, for by this time the fact is well known. Indeed, I feel sure that dermatologists are not doing ringworm work today without adhering to Sabouraud's formulas. Hodges [43] and McMillan [44] have done much toward reducing this source of error, but the situation is not yet corrected. I have discontinued the use of maltose, following Sabouraud, substituting crude dextrose for it. I still use Chassaing peptone because it is still readily available. Furthermore, even on Sabouraud's standard mediums, variation will occur in the colonies, and the worker must standardize himself to the amount of variation to be expected in the different species, and plant numerous colonies before finally appraising an unknown. The amateur's work is worthless, as a final contribution to science, until he has spent much time in practice on known species.

After this, one will encounter difficulties in studying the cultures microscopically. Microscopic study should be made in all cases; some species are distinctive grossly to the expert when developed at their best, but most require microscopic study in addition. In this the best technic is the "hanging drop" method, recommended again by Sabouraud. A point to emphasize here is that the worker, as in the case of cultures in the gross, must not draw deductions on examination of a solitary culture. Not less than four, and preferably twice as many, hanging drops should be examined when one wishes to determine species accu-

43. Hodges, R. S.: Ringworm of Nails, Arch. Dermat. & Syph. **4**:1 (July) 1921.

44. Weidman, F. D., and McMillan, T. M.: Comparison of Ingredients of Ringworm Culture Mediums, Arch. Dermat. & Syph. **4**:451 (Oct.) 1921.

rately. Many times I have failed to discover spirals and organs nodulaires in a *Trichophyton gypseum* species which eventually developed them in but one of several preparations. Lewandowsky [45] has voiced similar warnings. That is, the full complement of microscopic appearances are not developed in all of the preparations. One must examine many, and come to a conclusion on the basis of the total observations. The preparations must be followed, too, up to at least four weeks.

And then, finally, one comes to the subject of classification, which is at the basis of determinative work. It has become a homily by now that fungus classification is badly jumbled; this is due partly to the attempt to utilize both clinical and mycologic characters as the basis for classification—an unwise plan. For instance, the achorions are those organisms which produce cups on the skin; microsporons are organisms which have small spores, and trichophyton and epidermophyton refer to the habitat of the fungus. That is, there is nothing consistent about this hybrid, quasiclinical classification. True, one can postulate microscopic morphologic qualities in addition, which pertain to each of the genera above, but with what effect? It develops that, both with the naked eye and under the microscope, the culture of what is called *Achorion gypseum* is also good for an animal microsporon.

Of course, this system does have a certain value when the approach to classification is from the clinical direction, but it has serious disadvantages when the problem originates elsewhere—for instance, when species are being determined from material which has its source in other places than in animal tissue; when one may be attempting to determine the source of certain cutaneous fungi by examining shrubbery, fruits, etc. A classification which is based solely on the morphology of cultures, gross and microscopic, would here be far superior to one which involves the appearance produced when the organism is growing in animal tissues. In short, it would be ideal if all fungi could be classified according to their appearance in test tubes and in hanging drops, utilizing only such mediums as could be used internationally, and in which permanency of composition could be assured. For instance, a synthetic medium made up of chemically pure inorganic salts containing nitrogen, phosphorus, carbon, oxygen, etc., could be used. However, all of the problems would not yet be solved, for at this juncture an additional disturbing factor may be introduced, i. e., the element of physiologic variation within species; an organism which may have a morphology almost identical with another, and which will produce the same abnormal tissue effect, may take on different forms at different times, even when the environment appears identical. I refer here to mutation or at least variation of species. I have already reported a

45. Lewandowsky: Arch. f. Dermat. u. Syph. **121**:531, 1916.

personal experience [46] illustrating this point, in which a fungus species from between my own toes, which I had been culturing regularly for years, suddenly changed from a soft, woolly form of colony to a powdery one.

This introduces the question whether such occurrences represent changes which are permanent, or whether they are simply temporary variations. In my own case the change was temporary, but that is only one case. It is impossible to generalize. The question is readily settled with higher plants by determining whether, on propagation, the mutation will occur in the mendelian ratio, but this resort is not possible in the mycologic field because the mode of reproduction is not sexual, and mendelianism cannot obtain. It is evident from the foregoing that there are numerous pitfalls in determinative mycology. Even if one escapes the faults in technical methods which are chargeable to oneself, there remain the elements of individual variation, morphologic and physiologic, on the part of the fungi. Obviously, the determinations must be made in the broadest frame of mind, open at all times to the possibility that some error may creep in, and that it is easy for even the most careful worker to be wrong, in the strict scientific sense of truth.

After these last considerations, the earlier sections of this paper must be regarded in a more modified light. The data compiled, and the tables constructed certainly cannot represent scientific truths. As an expression of established conclusions formulated through connected reasoning on unequivocal facts, they would be absurd. One would be deceiving himself if he took the data unqualifiedly, and without a full appreciation of the limitations which I have endeavored to set forth.

Fortunately, though, the limitations are not so strict or the errors so extreme as to vitiate entirely these data. Thus, even if there is error in the technical procedures, and even though there is more or less species variation, there are certain larger groups of fungi which are easily separable from the others, and this fortunately enters into the immediate problem—epidermophytosis. For instance, *E. cruris* is a species that is sharply separated from *Trichophyton rubrum* and also from most of the other species which are represented in intertrigo. Between *Trichophyton rubrum* and *Trichophyton interdigitale,* the differences are not as great, particularly the microscopic ones, and it is possible that the tinctorial ones of the test tube are only minor biologic variations; in general, color production by fungi is a rather variable character, even within the same species. Furthermore, the data which I am submitting gain in value when it is recalled that, even

46. Weidman, F. D.: Morphologic Variations in Ringworm Species of Toes Followed in Primary Cultures Over Period of Years, Arch. Dermat. & Syph. **13**:374 (March) 1926.

though certain characters are not permanent and are not the inherent ones which have value in the determination of strict biologic species—in spite of these shortcomings from the severe biologic standpoint—some of them may have a definite practical clinical value. To cite a well known example, the hemolysis which is exhibited by some strains of streptococci may be lost in the subcultures, yet in the application to human disease processes the element of hemolysis has a practical clinical value. Hence, it may be the same in the case of *Trichophyton rubrum* and *Trichophyton interdigitale*. It is regrettable that characteristics are not permanent in these species, that they disappear more or less promptly in subcultures, and that many organisms must be identified in the primary, or at least earliest, cultures; but this cannot stand as a final barrier against the utilization of laboratory methods. An abundance of information remains to be seized on.

The situation stands thus. Provided that the worker has served a full apprenticeship by working with a sufficiently ample collection of fungus species; provided that he has paid due attention to the microscopic characters as well as to the gross cultural ones; provided that the determinations are made on freshly isolated material, and provided that his deductions are not made on the basis of more or less minor characteristics which have not been adequately proved to be constant—under these circumstances laboratory results are calculated to add much to the knowledge of ringworm in general. Reports of fungus studies which include "unidentified" or *"Trichophyton gypseum"* without specifying "asteroides" "radiolatum," etc., are the stronger for it because they indicate an appreciation on the part of the worker that there are limitations in the determination of "gypseum" and other species, and that the worker has the correct scientific attitude.

The way to sound, constructive advance in ringworm today lies in fundamental mycology, not in hairsplitting considerations of differences of morphology and the multiplication of new species.

HYGIENE

Viability of Fungus Material in Scales.—There are three reports in the literature as to how long fungus material may remain viable after it has left the body; to these I would add a fourth. Thus, in Dold's work,[29] scrapings from tinea cruris developed colonies of *E. cruris* after they had been drying for twenty days, but not after thirty days. On the other hand, Farley[47] secured a growth of *E. cruris* in materials which had been taken from the groin, and which had been preserved in envelopes 432 days. While this is exceptional, it still turned out in his series of tests that one third of the *Epidermophyton* cases were

47. Farley, D. L.: Viability of Ringworm Fungi in Dry Cutaneous Material, Arch. Dermat. & Syph. **3**:759 (June) 1921.

viable after five months. Mitchell [34] has kept *E. cruris* scrapings 180 and 300 days, and those of *Trichophyton interdigitale* also 300 days. The fourth set of tests is my own; scrapings from between the toes were kept in a test tube and gave cultures of *Trichophyton interdigitale* for eight months.

Apparently, from six months to a year may be calculated as the approximate time during which dried ringworm fungus material may survive. I would at once call attention to the fact, with Farley, that fungi imperfecti, to which these ringworm species belong, do not have nearly as resistant spores as do bacteria; once detached from their habitat in the skin, the problem of hygiene is not nearly as formidable as in the bacterial cases in which spores are concerned.

These data are important in the matter of disinfection of clothing, and I have made a slight further venture on the subject by wearing pieces of muslin for a week, between the toes affected by ringworm, and then

TABLE 5.—*Viability of Fungus in Scrapings "Extra Corpore"*

Infection	Organism	Observers	Cases	Cultures Secured	Number of Days Viable
Tinea cruris (paper envelopes).....	E. cruris.....	Dold	4	...	12 20 20-20
Tinea cruris (paper envelopes).....	E. cruris.....	Farley	9	3	145 174 433
Toe ringworm (dry test tube).....	Tr. interdigitale	Weidman	1	1	180
Toe ring worm (paper envelops)....	Tr. interdigitale	Weidman	1	0	...
Toe ringworm	E. cruris.....	Mitchell	2	...	180-300
Toe ringworm	Tr. interdigitale	Mitchell	1	1	300

planting the material on mediums. I have tried this five times, and the fungus would not grow in any case, even though bacterial colonies were abundant. Yet, in the control, there was an abundant growth when the surface material was curetted off and planted on medium. Perhaps the disease is disseminated less by the stocking than by the rubbing of the towel immediately after the bath. This, of course, would be the more likely rationale in the case of those who bathe frequently. In the case of uncleanly persons, fungus-laden epiderm would perforce adhere to the stockings at one time or other, and the stockings would then be a more important means of dissemination.

In view, then, of the low thermal death-point of at least some of the ringworm species, and particularly because cleanly people probably disseminate the fungus more by the towel than by the stockings, it is recommended that the feet should be dried in the bathtub, and that the tub should be flushed with scalding hot water at the conclusion of the bath. The towel should be allowed to lie in hot water in the tub for half an hour or more afterward. Dry wash cloths might be substituted, as a matter of expedience, for towels in drying the feet.

This rationale is applicable, of course, only to cases in which the fungus species concerned has a sufficiently low thermal death-point, and to those cases in which the patient realizes the importance of his condition to himself and his family. The latter is the more exacting requirement. Even under such circumstances, it is unlikely that he will be sufficiently unremitting in his precautions, or have sufficient hygienic insight, completely to prevent fungus leaks into the household. The most that can be hoped for is a decrease in the distribution of the fungus material.

PATHOLOGIC HISTOLOGY

Superficiality is the keynote in the pathologic histology; to this is added the picture of progressively increasing grades of inflammation reflecting the nature of the case clinically. Kauffman-Wolff's paper [20] showed photomicrographs in which the vesicles of dyshidrosis are seen to be within the epiderm exclusively. They contained fibrin, leukocytes and nuclear detritus; but fungus structures could not be demonstrated. She explained this on the basis that the vesicles in her case had become secondarily infected and were suppurative, under which circumstance it is well known that fungus is scarcely demonstrable, even in sodium hydroxide preparations. She reported Unna's polychrome methylene blue as most useful for sections, but did not indicate in what respect it was superior; however, von Graffenried [6] intimated that it stained the mycelium well. He discussed Kauffman-Wolff's work and gave a histologic description in full. In only one vesicle did he find fungus.

Sicoli,[48] working in Sabouraud's laboratory, also examined vesicles from cases of dyshidrosis. He found "true" cases in which the vesicles communicated with sweat ducts, and "false" ones in which they did not. Cases caused by fungi were of the false type. He did not describe these sections in detail, but the vesicle is figured within the epiderm exclusively; its lining is not sharp as would be the case if it were a dilated duct and it contains a few loosened epithelial cells. Nothing is stated as to the presence of fungus in sections. Appearances are the same for his "true" and "false" dyshidroses except when the plane of section has been such as to reveal that the sweat duct communicated with the vesicle in the "true" cases, and that the duct bent *around* the vesicle (compression laterally by the vesicle) in the mycotic cases. He contends that the position of the vesicle, i. e., whether within the interpapillary peg or not, is a further difference. Theoretically, this is true, but in his figures the vesicle was so large or had produced so much distortion of the epiderm that its relation to precisely this or that papilla or interpapillary peg was most doubtful.

48. Sicoli, A.: Ann. de dermat. et syph. **5**:69 (Feb.) 1924.

In sections of a "soft corn," avulsed from a macerative type of toe ringworm, I have seen sparing examples of hyphae in the stratum corneum about midway between the stratum granulosum and the skin surface. They stained muddy blue with hematoxylin and eosin. There were myriads of bacterial colonies on the surface and also penetrating for a short distance into the clefts of the upper corneous strata. Clusters of yeast cells were also identified, a little farther down than the bacteria. Micro-organisms of any kind could not be found in the stratum granulosum or below it.

RATIONAL THERAPEUTICS

It must be acknowledged at once that the heading above refers to attempt rather than to accomplishment. While Schamberg and Kolmer [49] and others have tested the aniline dyes and other chemicals and indicated which are the most potent in the test tube, the factor of penetration of the chemical remains a problem which cannot be escaped. It has already been emphasized by dermatologists at large that underlying the successful treatment of ringworm of the toes is the thorough removal of as much epiderm as possible.

Thus far, chemicals and antiparasitic drugs have been successful to only a limited extent. The residue of failures appears to be large. This is certainly referable in part to failure of the drug to penetrate sufficiently deep, but doubtless many cases of toe ringworm are cured by Whitfield's ointment and otherwise; however, the periodic exacerbations are the result of reinfection and are not continuations of the original. It is impossible to settle the point with finality; however, the certain fungicidal, or at least fungistatic titer of salicylic acid, and particularly its extreme keratolytic capacity, together with the ubiquity of fungus material around the homes, hotels and elsewhere, make it inevitable that many cases must be cured and that the recrudescences are referable to reinfection.

The roentgen ray has been lauded by a number of observers. It has not been quite clear to me in such reports whether improvement was noted in the heavy keratotic forms, such as appear between the toes, as well as in the more superficial eczematoid expressions, such as occur on the dorsum of the foot. Improvement under the latter circumstances is easily understood, just as in cases of eczema. But since roentgen rays do not have any direct fungicidal powers, as used at present, and since indirect effects have not been claimed for them, these agents cannot be regarded as rational therapeutic ones.

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49. Schamberg, J. F., and Kolmer, J. A.: Studies in Chemotherapy of Fungus Infections; Fungistatic and Fungicidal Activity of Various Dyes and Medicaments, Arch. Dermat. & Syph. **6**:747 (Dec.) 1922.

What avenues of attack remain? The therapeutic approach by internal medication, by way of the blood stream, is not immediately promising—the balance between resistance of the fungus and the concentration of present day fungicides possible in the blood stream, together with the superficial position of the fungus, are unpromising at the outset. Roentgen rays are more encouraging with such measure of success as has been reported already; perhaps one could determine the precise wave-length of the fungicidal rays, and screen out all others so that the effective rays, if present, could be used in tremendously high concentration, without the remaining rays producing a dermatitis. The same might be possible also for ultraviolet rays.

Biologic Therapy.—Several years ago, I noted that those portions of a certain ringworm fungus colony which were adjacent to a bacterial colony did not develop as luxuriantly as the more remote parts; the result was a lopsided fungus colony. A bacterium was present which restrained the growth of the fungus, but did not destroy it, d'Herelle-wise.

With the idea of isolating such an organism which could be established more or less permanently between the toes, I tested out a number of yeast species obtained from normal feet, and finally secured one which inhibited the growth of *E. cruris* when mixed with it and planted on culture mediums. Thus far I have been able to apply the yeast in only three cases: an experimental *E. cruris* infection of my own toes cleared up in three months, as already related; two cases of *Trichophyton interdigitale* infection were not affected.

In short, these tests are still being made, and the final answer is not ready. The principle is the same as Metchnikoff's, in his scheme for the prolongation of human life. Success in this direction is the consummation devoutly to be desired, inasmuch as it would solve the problems just discussed under "Hygiene."

In this connection it should be recognized that the organism as applied between the toes need not necessarily be one which is directly antagonistic to the fungi. There is a possibility that some species of bacteria are synergistic toward fungi, and under these circumstances micro-organisms which are effective against synergists would also rank as rational therapeutic agents.

Heat.—Impressed by the regularity with which many ringworm species were destroyed by drying in the test tube, in contrast to the resistance of the ordinary saprophytic fungi, it occurred to me that the parasitic form might be vulnerable in other directions also. Thus, although my laboratory test tubes and stoppers are used over and over again, the pathogenic species has never occurred as a "contaminant" on my culture mediums, although the aspergilli and other saprophytes

do so. Some preliminary tests showed that a penicillium withstood a temperature (51 C.) which promptly killed the fungi imperfecti, to which class most of the ringworm species belong. Table 6 shows the results.

Supplementary experiments at a slightly lower temperature verified the results. Most of the species were killed within ten minutes by exposure to 48 C.; this temperature may be withstood with some discomfort by the average foot. Indeed, some species were yet more susceptible, and were killed by an exposure of five minutes. The results were not ideal by any means, because there were discrepancies within the same fungus species, as may be seen by comparing the two

TABLE 6.—*Thermal Resistance of Fungus Species in Culture*

	Organism	Control	Minutes at 48 C. 5	10
889	A. schönleinii	+	+	+
1043	Tr. interdigitale	+	0	0
1087	E. cruris	+	+	0
1340	Blastomycosis	+	+	+
1341	Tr. gypseum	+	0	0
1357	M. lanosum	+	+	0
1358	E. cruris	+	0	0

		Control	Minutes at 51 C. 5	10	15	20	25	30	35	40	45
1341	Tr. gypseum	+	+	0	0	0	0	0	0	0	0
1341 (2)	Tr. gypseum	+	0	0	0	0	0	0	0	0	0
989	M. fulvum	+	+	0	+	0	0	+	+	+	+
358	P. brevicaule	+	+	+	+	+	+	+	+	+	+
1087	E. cruris	0	0	0	0	0	0	0	0	0	0
1087 (2)	E. cruris	+	0	0	0	0	0	0	0	0	0
889	A. schönleinii	+	0	0	0	0	0	0	0	0	0
889 (2)	A. schönleinii	+	0	0	0	0	0	0	0	0	0
1043	Tr. interdigitale	+	0	0	0	0	0	0	0	0	0
1042 (2)	Tr. interdigitale	+	0	0	0	0	0	0	0	0	0
1340	Blastomycosis	+	0	0	0	0	0	0	0	0	0
1358	E. cruris	+	0	0	0	0	0	—	0	0	0

parts of table 6. At any rate, enough was brought out to enable us to generalize that most of the species were killed at temperatures far below the thermal death-points of bacteria, not to mention the saprophytic fungus forms.

The foregoing tests had to do with fungus material in culture. Inasmuch as the resistance of material in scrapings may differ from that of cultures, the following tests were performed on material in scrapings from two *Trichophyton interdigitale* subjects. The scrapings were first examined in water under the microscope for mycelium, and found to be positive. They were then heated in physiologic sodium chloride solution at 48 c. for ten minutes, and planted. A solitary colony developed in one of the tubes inoculated with heated material, whereas they were consistently present on the controls. The effect of these tests, if they are confirmed by repetition, will be to bring some species of fungi, but not all, within reach of a therapeutic agent that is penetrative to

an extent to which chemical ones are not. How far the method will be interfered with by anatomic and other practical considerations remains to be developed.

In opposition to this, Mitchell [84] was able to secure a culture of *E. inguinale* from material which had been brought to the boiling point in a 15 per cent solution of sodium hydroxide. Evidently there is much to be learned of the variation of different strains.

It remains only to emphasize the fact that these experiments in rational therapeutics are not final. They constitute only a lead. It is not recommended that the profession undertake to cure ringworm by this method at present.

SUMMARY AND CONCLUSION

In the foregoing sections an attempt has been made to collect the scattered data bearing on the "pathologic" aspects of that ill-defined dermatosis known in this country as epidermophytosis. At the same time several phases of the subject have been analyzed and criticized, and some scattering and more or less incomplete original work from my own laboratory has been included. Much is only a lead as yet—so much so that I would not make this report if I did not wish to share my laboratory experiences promptly with those of the clinic who share so much with me.

THE ENLARGING CONCEPTION OF DERMATOPHYTOSIS *

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At present, the word eczema is used to designate almost any dermatitis whose cause has not been discovered. Thus, in the past, the word tinea was used for any disease of the scalp, for the ancients had no means of establishing the etiology of any of these diseases, except perhaps pediculosis. Nevertheless, one form of tinea differed so greatly from all the others, and had such cleancut peculiarities, that it became known as tinea vera. It was known also as tinea lupinosa, and later, in England, as porrigo lupinosa. This is the disease now known as favus. The tinea favosa of all authors before 1800 was not favus at all but impetigo. The transfer of the adjective, favosa, from impetigo to the disease now known as favus was due to Alibert, whose mistake has become fixed in modern usage. Although the disease was recognized as a distinct entity, its etiology remained uncertain and a subject for debate until the discovery of the parasite by Schönlein in 1839 and independently by Gruby in 1841. The debate continued perhaps more fiercely than ever. E. Wilson [1] wrote in 1847, "To my mind, there is nothing impossible in the supposition of the origin of the growth from morbidly developed epidermal cells of the hair follicle, or from those of the sebaceous substance." It reminds one of the claim advanced a few years ago that the objects then recently described as spirochetes were in reality only degenerated nerve fibrils. But Wilson was wavering in his unbelief, for two pages later, in the same edition, he recommends the destruction of the vitality of the parasitic growth by bathing the scalp with a moderately strong solution of bichloride of mercury. The new doctrine gained general acceptance, though Cazenave, as late as 1868, still refused to believe.

To attempt to get an idea of the ancient doctrines concerning trichophytosis and microsporosis is much more difficult, and one becomes lost in a maze of confused and inadequate description. Some of the notes which follow are taken from Sabouraud's masterly work "Les Teignes," which should be read by every student of the subject; they are chiefly

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* Read at the Golden Anniversary Meeting of the American Dermatological Association, Philadelphia, May, 1926.

1. Wilson, E.: Diseases of the Skin, American ed. 2 from London, ed. 2, Philadelphia, Lea & Blanchard, 1847, p. 393.

from the original sources. The English seem to have been the first to separate tinea tonsurans from the other scalp diseases; they applied the word "ringworm" to it and to tinea circinata, and recognized the relationship of the two diseases, their frequency in children and their contagiousness. Bateman,[2] in his Atlas under the title Porrigo Scutulata, shows a child with a red circle on the temple, partly on the glabrous skin and partly on the hairy scalp, with typical lesions of tinea tonsurans on the rest of the scalp. In France all was confusion. The Mahon [3] brothers, not physicians, gave a good description of tinea capitis and mentioned its transmission to skin and nails, but they made little impression on the medical public. Alibert [4] mentions porrigine tonsurante among the scalp diseases, and identifies it with porrigo decalvans of Willan, which is alopecia areata, and with teigne tondante of Mahon, which is tinea tonsurans. Alibert's description suggests tinea tonsurans. Alibert did not recognize the contagiousness of either favus or tinea tonsurans. He tried to inoculate his pupils with favus, and failed, whence he concluded, justly, that an unusual predisposition is essential; but falsely, that the disease is not transmissible.

In 1840 Cazenave made the distinction between porrigo decalvans (alopecia areata) and herpes tonsurans (tinea tonsurans), and thereafter only was the latter recognized clearly as a distinct disease. Soon after, and before the distinction so carefully drawn by Cazenave was thoroughly understood and appreciated, Gruby [5] published a description of a parasite, which he named *Microsporum audouini* in what he called porrigo decalvans. This disease, the present alopecia areata, was described by Bateman [2] as characterized by bald spots on which the skin was smooth, white, shiny and devoid of hair. Gruby, however, perhaps following Alibert's error, described it as characterized by rounded plaques covered with a white powder and little grayish scales, and by the fall of hair. Gruby states also that the diseased hair projected from 1 to 3 mm. above the skin. Of course Gruby's case was not porrigo decalvans, but microsporosis. The next year Gruby [6] read another paper entitled "Recherches sur les cryptogames qui constituent la maladie contagieuse du cuir chevelu decrite sous le nom de teigne tondante (Mahon) Herpes tonsurans (Cazenave)," in which he described a *Trichophyton endothrix*. His description of the disease itself is hardly distinguishable from that given of porrigo decalvans in his previous memoir—the only additional

2. Willan and Bateman: London, 1849 (apparently unchanged from earlier edition).

3. Mahon: Recherches sur le siège et la nature des teignes, 1829, cited by Sabouraud: Les Teignes, Paris, Masson & Cie., 1910, p. 16.

4. Alibert: Monographie des dermatoses, ed. 2, Paris, G. Baillière, 1835, p. 469.

5. Gruby: Compt. rend. Acad. d. sc. **17**:301, 1843.

6. Gruby: Compt. rend. Acad. d. sc. **18**:583, 1844.

feature mentioned is the presence in the bald areas of little projections like those commonly called goose-flesh. Gruby said nothing in either memoir about the age of his patients. The confusion that resulted can be imagined. Other workers tried to find fungi in alopecia areata, and some said they found them: perhaps they were fortunate enough to see cases of so-called "bald ringworm." The vast majority reported truthfully that fungus was not to be found in porrigo decalvans, and concluded that the work of Gruby was all a romance. Of course, the dermatologists found many cases of ringworm of the scalp, which in France were mostly microsporon infections, and found the hairs infected with vegetable parasites, which they called *Trichophyton,* a name coined by Malmsten for the organism of true trichophytosis. But the dermatologists were not mycologists and never realized that they were looking at the fungus already described by Gruby as *"Microsporum audouini."* It was not until the closing decade of the nineteenth century that the work of Sabouraud put on a sound basis the distinction between the two grand types of tinea capitis, and assigned to each its proper parasite. The lesson to be drawn from all this confusion is that every pathologic report should be accompanied by a complete clinical description of the case itself—not a name only.

It is almost impossible to recognize tinea of the glabrous skin in the reports of the older authors. Ringed eruptions are described, but the disease as a separate entity was still undifferentiated, except by the English, until the time of Cazenave.

Pustular inflammations of the bearded face have been known from the most ancient times, and the contagiousness of some forms was recognized, but it was impossible to separate tinea barbae from the other forms until the parasite was discovered and described by Gruby.[7] The description of the parasite, *Trichophyton ectothrix,* is excellent, and that of the eruption is fair. In this instance, the skin was dry and scaly, and there were not any pustules. Thus far, Gruby was evidently describing a particular case, but in giving the location of the disease, he reverted, apparently, to the classic description of sycosis, and stated that the disease usually occupied the chin, the upper lip and the cheeks. Of course, this led to confusion, for tinea of the upper lip is a medical curiosity, while coccogenic infection of that region is common. Some authorities claimed that all cases of sycosis were due to the new found organism, and made various excuses for not finding it, much as authors are now found who claim that all cases of dyshidrosis are of fungoid origin, though the fungus cannot be found. Gradually the truth emerged, that there are two types of sycosis, and that often the diagnosis can be made only by the microscope.

7. Gruby: Compt. rend. Acad. d. sc. **15**:512, 1842.

After the work of Gruby had pointed out the way, the dermatologists of the nineteenth century gradually brought comparative clarity to what had been a confusing branch of medicine. Tinea capitis, tinea barbae, tinea circinata and tinea unguium were well known and well described, their parasitic nature was understood and the parasites were recognized; and if diagnosis was at times difficult it must be confessed that it is only a little easier now.

The work of Sabouraud and other investigators in differentiating and classifying the various genera and species lies beyond the scope of this paper.

The first extension of the conception of ringworm of the glabrous skin beyond the narrow limits of tinea circinata was made by Devergie [8] who gave a brief description of tinea cruris as a form of herpès circiné. Hebra,[9] three years later published a complete description of this disease, even mentioning its dissemination to the back, breasts, nape and extremities, and in 1864 Köbner [10] demonstrated mycelial elements and their inoculability. Hebra's note of the involvement of the extremities in a case of tinea cruris attracted little attention, and general interest in tinea of the extremities dates from 1908, when Whitfield [11] described a series of six cases, including a group of four in one family, which presented characteristic lesions on the palms, soles, toes and fingers. It is hard to see how the involvement of the toes in cases of tinea cruris had been overlooked so long, except on the theory that the patients were not carefully examined. In 1910 Sabouraud [12] published a masterly summary of the whole subject of tinea cruris and its associated lesions, and since that time the work on this subject has been extensive, though apparently it is still unknown to the medical profession at large.

By 1910, therefore, dermatoses caused by the growth of vegetable parasites were recognized as occurring on all parts of the skin from the sole to the head, and a good beginning had been made in the study of the parasites themselves. Investigation since then has been productive, and it is now generally recognized that mycotic infection may involve any part of the cutaneous surface, and that the lesions which it produces may be extremely varied and may bear little or no resemblance to the classic picture of tinea circinata. They may be superficial, dry and scaling; deep and vesicular; closely agglomerated and pustular, or moist

8. Devergie: Maladies de la Peau, ed. 2, Paris, V. Masson, 1857, p. 273.

9. Hebra: Handbuch der speciellen Pathologie und Therapie, Virchow, 1860, vol 3, part 1, p. 361.

10. Köbner: Klinische und experimentelle Mitteilungen aus der Dermatologie und Syphilidologie, Stuttgart, Ferdinand Enke, 1864, p. 6, cited by Sabouraud: Les Teignes, Paris, Masson & Cie., 1910, p. 425.

11. Whitfield: Lancet **2**:237, 1908.

12. Sabouraud: Ann. de dermat. et syph., series 5 **1**:289, 1910.

and macerated as in intertrigo. The diagnosis is often exceedingly difficult, but at least the clinician has these conditions in mind when called on to judge the case before him. There is another aspect of the mycoses, however, which up to the present has received but little attention. It has been the custom to think of them as confined to the epidermis and its appendages, occasionally accompanied by subjacent inflammation, which was usually explained as a mixed infection. Of constitutional changes there was no hint, until recent years. A search through standard dermatology texts shows a meager description of kerion, often with surprising misstatements, and without any hint that the condition may cause fever, prostration and other symptoms. One last edition (Sutton,[13] 1926) mentions a single case of kerion in which there were 3 degrees of fever, while another (Pusey,[14] 1924) mentions constitutional symptoms under trichophytide, but not under kerion. That is all.

The first notice of generalized eruptions occurring in connection with focal mycotic infection, the inspiration for all the later work, was taken by Jadassohn,[15] who, in the discussion of Bloch's paper on trichophytosis, described several cases of kerion, in which spiny lichenoid papules were scattered over the trunk. His cases, with others, were later reported in full by Guth.[16] Jadassohn [17] mentions these cases in his translation of Darier, but the paragraph seems to have attracted little attention in this country. Meanwhile, articles continued to appear in the European press, and in 1921 Bloch [18] published an excellent summary of the advances made up to that time. Other cases have been recorded since, and it is now possible to give a fairly accurate description of the condition, though there are many disputed points to be settled.

In all the earliest cases, the infecting organism was a trichophyton, most often of the gypseum group, but more recently cases have been reported, which were caused by a microsporon or by an achorion. In order to produce general symptoms, one of two conditions must be fulfilled—the original site of infection must become deep seated, either spontaneously or as a result of treatment, or else there must have been roentgen-ray treatment. I have not yet found any record of a case of superficial untreated tinea which spontaneously developed dermatophytide. It is easy to explain the occurrence of generalized symptoms in deep tinea by assuming the formation and wide dissemination of toxins, but

13. Sutton: Diseases of the Skin, ed. 6, St. Louis, C. V. Mosby Company, 1926.

14. Pusey, W. A.: Principles and Practice of Dermatology, ed. 4, New York, D. Appleton & Co., 1925, p. 794.

15. Jadassohn: Cor. bl. f. schweiz. Aerzte **42**:24, 1912.

16. Guth: Arch. f. Dermat. u. Syph. **118**:856, 1913.

17. Jadassohn and Darier: Grundriss der Dermatologie, Berlin, Julius Springer, 1913, p. 269.

18. Bloch: Ann. de dermat. et syph., series 6 **2**:1 and 55, 1921.

it is hard to understand why the exposure to the roentgen ray of a superficially infected scalp should be followed by an eruption elsewhere, as the roentgen ray is supposed not to have any effect on the parasite itself.

The constitutional symptoms which sometimes accompany the development of trichophytide in kerion cases are striking, but they present nothing pathognomonic. Fever, with its accompanying weakness, is the commonest feature. Leukocytosis and enlargement of the lymph nodes are frequent, while enlargement of the spleen, swollen and painful joints, headache, vomiting and bronchitis have also been reported. The diazo reaction is often positive. It does not seem to me to be probable that these symptoms are confined to the cases that develop dermatophytide; I believe they occur in many cases of kerion, but are overlooked until the presence of a generalized eruption draws attention to the probability of a generalized infection.

Several forms of the general eruption have been observed, and the same patient may present several forms at the same time. The commonest type is lichenoid. This usally is somewhat scarlatiniform at the start, but in a few days it develops small rounded or acuminate papules, closely resembling those of lichen scrofulosorum, and usually arranged in corymbose groups. With the passage of time, these papules become darker and then flatten out, often with the formation of fine scales. This type has been described by nearly every author who has written on the subject. The scarlatiniform type is usally only an early stage, the eruption later becoming lichenoid or papular, but sometimes it persists several days, covering large areas. Associated with the scarlatiniform rash there may be an eruption on the mucous membrane of the mouth (Sutter [19]). Sometimes pustular lesions appear (Bloch,[18] Bruusgaard,[20] Pulvermacher [21]).

Lesions exactly corresponding to erythema nodosum are reported by Bloch,[18] Bruusgaard,[20] Pulvermacher [21] and Sutter.[19] The lesions are tender, sometimes painful, and may be accompanied by swollen joints. All the symptoms, constitutional and cutaneous, develop when the kerion has reached its height, or is beginning to decline. They last a short time—a few weeks at most—and disappear spontaneously without treatment. There are not yet sufficient statistics to enable one to form an estimate of the frequency of these cases. They are but little known, and are seldom looked for. Ambrosoli [22] states that of 1,947 cases of tinea seen at the Ospedale Maggiori in Milan, including 487 with deep suppuration, only three instances of trichophytide were seen.

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19. Sutter: Arch. f. Dermat. u. Syph. **127**:735, 1919-1920.
20. Bruusgaard: Acta derm.-venereol **3**:21, 1922.
21. Pulvermacher: Dermat. Ztschr. **27**:11, 1919.
22. Ambrosoli: Gior. ital. di mal. ven. **62**:235, 1921.

Dermatophytide occurring after exposure to the roentgen ray, in superficial tinea, is usually of the lichenoid type, and without constitutional symptoms. It is interesting to note, in this connection, the frequent development of small pustules on the scalp of patients who have been exposed to roentgen-ray epilation. These cases are seen in every clinic, but as far as I know they have never been explained. The pustules usually disappear in a few days or weeks.

Eruptions of a similar nature have been recorded in connection with severe tinea of the glabrous skin, but without any constitutional symptoms. Since my report of last year,[23] I have found the records of three others: one reported by Pollitzer [24] in his discussion of that paper, and two by Burgess.[25] In every case, the eruption develops suddenly, on parts of the body widely removed from the original focus of infection. The commonest type is an eruption of superficial vesicles. Other cases have presented erythematous patches of various size, while in still others the eruption was lichenoid or papular. In the case reported by Pusey,[14] and in that reported by Seeman and Rajka,[26] in which the eruption followed the inoculation of a culture of *Trichophyton gypseum* on scarifications, the eruption was like erythema multiforme, and in one of my own cases it resembled pityriasis rosea.

To sum up: in the course of certain cases of severe tinea of the hairy parts, there have been observed constitutional symptoms such as occur in the course of many infections, and generalized eruptions which appear suddenly and which run a self limited course; while in severe tinea of the glabrous skin similar generalized eruptions but no constitutional symptoms have been observed. These are facts of observation, and are beyond dispute. The interpretation of these facts is a different matter, and evidence must be adduced to prove that the constitutional symptoms and the generalized eruptions are directly dependent on the antecedent tinea. In the first place, mycotic organisms have been recovered by culture from the blood of these patients. Jessner [27] found an unidentified organism similar to *Trichophyton granulosum* in the blood of a boy, aged 10, about four weeks after roentgen-ray treatment of superficial tinea. The generalized eruption began a few days before the culture was made, and resembled measles, later becoming lichenoid.

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23. Williams, C. M.: Dermatophytid Complicating Dermatophytosis of the Glabrous Skin, Arch. Dermat. & Syph. **13**:661 (May) 1926.

24. Pollitzer, Sigmund, in discussion of Weidman, F. D.: Morphologic variations in a Ringworm Species of the Toes, Arch. Dermat. & Syph. **13**:381 (March) 1926.

25. Burgess, J. F.: Fungus Infections of Skin; Cultural Study of Flora of Ringworm, Arch. Dermat. & Syph. **12**:853 (Dec.) 1925.

26. Seeman and Rajka: Arch. f. Dermat. u. Syph. **143**:9, 1923.

27. Jessner: Arch. f. Dermat. u. Syph. **136**:416, 1921.

There were few or no constitutional symptoms. The retro-auricular, nuchal and cervical lymph nodes were enlarged. The same organism was obtained from the head. In the same article, Jessner reports the recovery of *Trichophyton gypseum* from the blood of a boy, aged 11, suffering from kerion of the scalp and superficial tinea of the body, and from extensive lichen trichophyticus. The culture was made four days after the inunction of a 50 per cent solution of trichophytin-lanolin on normal skin, and three days after roentgen-ray exposure for epilation. Constitutional symptoms were not present. Later, Jessner [28] reported the case of a man suffering from severe tinea barbae. Trichophytin was injected into the diseased area, and also intravenously. There was not any generalized eruption, and mention is not made of any local or general reaction. Blood cultures gave a growth of *Trichophyton gypseum*, the same parasite being obtained from the face also. Ambrosoli [22] recovered *Trichophyton gypseum asteroides* from the blood and from the scalp of a boy, aged 11, suffering from kerion, with tinea circinata on the nape. When the blood culture was taken the boy was feverish, the cervical and inguinal glands were enlarged and slightly tender, the spleen was swollen, and there was an extensive eruption of small scattered follicular papules, with diffuse erythema.

Arzt and Fuhs [29] recovered the *Microsporon audouini* from the blood of a patient with a microsporon infection of the scalp, who had been treated with the roentgen ray. Three days after the blood was drawn, a generalized lichenoid exanthem appeared. Masia [30] recovered the *Trichophyton crateriforme* from the blood of a boy, aged 9, who was suffering from kerion. There was not a diffuse eruption in this case. If mycotic organisms may pass into the blood, it is altogether probable that mycotic toxins also pass into the blood, and more frequently. The recovery of the organisms from the blood in these cases does not prove that they were the cause of any generalized symptoms that might be observed—it proves only that the fungi, and presumably their toxins, may be present in the blood, ready to act on the skin, if the skin is ready to react. A second series of observations proves that the skin of a patient suffering or having suffered from severe tinea will often react to the inunction or the injection of tinea vaccines by the production of lesions entirely analogous to those previously mentioned as having been observed in the course of deep infections. The commonest reaction is the exaggeration of an already existing lichenoid eruption. Bloch [18] reports the case of a girl, aged 11, who was suffering from kerion and a generalized lichenoid eruption, with a temperature of 38 C., and a slightly enlarged

28. Jessner: Zentralbl. f. Haut. u. Gesch. **6**:73, 1922-1923.
29. Arzt and Fuhs: Arch. f. Dermat. u. Syph. **143**:52, 1923.
30. Masia: Gior. ital. d. mal. ven. **65**:1258, 1923.

spleen. After the injection of trichophytin the temperature rose to 38.5 C., and after another injection to 40 C., while subcutaneous nodules appeared on both legs, reproducing erythema nodosum. They were tender on pressure, and the skin over them was bright red. Martinotti [31] reports the case of a girl, aged 8, with multiple patches of tinea on the scalp, caused by *Trichophyton acuminatum*. She was given roentgen-ray treatment, and the hair fell in from fifteen to twenty days without the appearance of any eruption. After another twenty days, living cultures of *Trichophyton plicatile, acuminatum* and *faviforme* were implanted on the patient's back after superficial scraping. The grafts gave rise to lichenoid corymbiform lesions which healed spontaneously in from eight to ten days. While they were developing, an eruption of the type of nodular erythema appeared on the legs, accompanied by rheumatoid pains.

Sutter [19] reports an enanthem and a scarlatiniform exanthem soon becoming lichenoid, occurring after the injection of trichophytin in a patient with severe tinea of the scalp. Bloch [18] reports the case of a boy with severe kerion of the scalp, accompanied by fever, swelling of lymph nodes and leukocytosis, and an extensive eruption of pustules, which proved sterile on culture. The day after each of three injections of trichophytin, an erythematopustular eruption covering a zone about 10 cm. in diameter was observed around each injection point, exactly corresponding in appearance to the spontaneous eruption. Bloch [18] reports also a case of a woman, in whom artificial inoculation with *Achorion quinckeanum* resulted in a moderately inflammatory plaque, about 1 inch in diameter, which increased to the size of the palm, healing in the center as it spread. About three weeks after inoculation, he injected trichophytin into the left forearm, which resulted in two days in local redness and swelling. The next day an eruption like erythema multiforme appeared on both hands. These increased in size, becoming depressed in the center, while the reaction at the point of injection also increased in size but as it progressed assumed a red raised border, the center flattening out and becoming brownish: in other words, the local reaction and the exanthem both presented the appearance of erythema multiforme. One of Guth's [16] cases, three days after the acme of a trichophytin reaction, developed a lichenoid exanthem, and some lesions resembling pityriasis rosea. Arzt and Fuhs [32] also reported lesions resembling pityriasis rosea after the injection of trichophytin in kerion cases.

Injection of trichophytin does not always produce a generalized eruption, but it is clear that it will do so under certain conditions. In many

31. Martinotti: Gior. ital. d. mal. ven. **64**:132, 1922.
32. Arzt and Fuhs: Acta derm.-venereol **4**:59, 1923.

of the recorded instances, injection of trichophytin was followed by a local reaction, while control injections with carbolic solution were negative. Enough evidence has now been produced to show that the skin of some patients with deep tinea is sensitive to trichophytin and that some have the organisms and probably the toxins in their blood. It is therefore extremely probable, at least, that the eruptions described are due to the action of fungi or their toxins on an abnormal skin.

Still further evidence is available. Sutter [19] was able to isolate the *Trichophyton granulosum* from the lymph node of a patient with kerion and a lichenoid exanthem, and in this case from the exanthem itself. This recovery of the fungus from the generalized eruption raises a most important question: does it not show that the whole series of lesions are caused by local inoculation from without? I do not think so. It has already been seen that fungi have been recovered from the blood and from a lymph node, thus proving in some cases, at least, that the infection is endogenous. A case of Bruusgaard's [20] throws still further light on this. The patient was a man, aged 68, with a severe kerion of the beard of two months' duration. The temperature as 38 C., and he was prostrated and had pains in the joints and muscles, while injection of trichophytine gave a weak reaction. Within two days of admission he developed a general nodose eruption, the lesions varying in size from ¼ to 1 inch (0.6 to 2.5 cm.). Miliary pus foci developed on the surface of these lesions, and around the older lesions fresh papulopustules appeared. A fresh nodule, barely twenty-four hours old, was excised, and microscopic examination showed bodies like spores, while culture produced a growth of *Trichophyton gypseum*, the same organism as that recovered from the head. There does not seem to be any reason to doubt that the infection was hematogenous in this case.

The first report of the finding of mycelia in lichenoid dermatophytide was made by Guth,[16] and it has been confirmed by Sutter,[19] Arzt and Fuhs,[32] Ambrosoli [33] and Martinotti,[31] the organisms being a trichophyton, a microsporon and even an achorion. The presence of fungi in the generalized eruption is rare, however, and it can be demonstrated only in the freshest lesions, those more than a day or two old being universally negative, in spite of repeated examinations. This is usually explained by assuming that the skin of the patient has become more or less immune to the disease.

The presence of fungi in these generalized exanthems raises several interesting questions. In the first place, is their presence accidental, or is it the cause of the eruption? The fact that they have been recovered from deep nodose lesions and from enlarged and softened lymph nodes is presumptive evidence that in those cases at least they were pathogenic.

33. Ambrosoli: Gior. ital. d. mal. ven. **64**:147, 1922.

For the profuse lichenoid eruptions, the question is more difficult; even in those cases in which fungi are found in the papules, they are found only on the first day or two, while the papules persist much longer. It may be that each papule was caused by the irritation of one or more parasites, and that the irritation persisted after the parasite disappeared, but it is at least equally plausible to assume that the irritant was, from the start, a toxin; and the probability of this is increased by the fact that the injection of toxins may produce identical lesions in susceptible subjects. It is quite possible that both explanations are true, that the papules may be caused either by the fungus or by its toxins. In either case, it must be assumed that there is an altered reaction of the skin, for neither the fungus nor the toxin produce a generalized exanthem in a normal skin.

In the second place, were the fungi brought to the papules by the blood stream or were they deposited on the surface? Now that the presence of the parasite in the blood, especially in the early days of the attack, has been demonstrated, the hematogenous route is possible, and is the most probable. This would account for the rapid development of the eruption on large and scattered areas of the body, while the increased resistance of the skin would account for the rapid disappearance of the fungus, whether the fungus were present in all lesions or only a few. In some cases, the fungus in the scaly lichenoid patches may have been deposited on the surface, as in a case of kerion with lesions of ordinary trichophytosis on the neck and lichenoid trichophytide on the trunk, and in a case of favus,[31] in which the use of roentgen ray was followed by scaly papular eruption, scrapings from which yielded mycelia But even in this case it is hard to believe that organisms deposited on the surface were the immediate provoking cause, and far harder to believe it in most of the cases, which occur at a time when the kerion has advanced so far that it is difficult or impossible to find the fungus in the primary focus. The simplest explanation is to assume that the trichophytic exanthem is caused by the action of toxins on a sensitized skin, that the fungi which may be found occasionally are brought either by the blood stream or through the air, and that in neither case can they survive more than a few days.

The reaction of the skin in these generalized cases may help solve some of the mysteries of tinea of the hands and feet. It is admitted that the general skin surface reacts abnormally, but one is apt to forget that the skin on or near the original focus may also show curious alterations. Recently, in my office, I saw a young woman with tinea of the toes, the scales being loaded with mycelia. After two weeks' treatment with Whitfield's ointment, potassium permanganate and tincture of iodine, there was considerable improvement, especially in the inflammatory reaction, but there were still many mycelia in the scales. In the furrow at

the base of the second toe, the very center of the infected area, there was a turbid vesicle, in the roof of which mycelia could not be found. Every one has seen cases in which the vesicle roofs were loaded with mycelia, others in which the vesicle roofs did not contain any mycelia and still others in which some vesicle roofs contained mycelia and some did not. How can these facts be explained except on the theory that the vesicle may be caused either by the fungus or by its toxins? That the altered reaction of the skin is greater near infected areas and near areas of trichophytide than elsewhere is shown by repeated experiments. Are not these sterile vesicles the result of the action of toxins on a hypersusceptible skin? The hand cases are a riddle to us; search after search is futile, and yet apparently identical lesions will sometimes yield a rich harvest of mycelia. I do not know any way of telling which lesion will be fertile and which sterile. I believe that in many of the hand cases only a small area is infected and that the rest of the eruption is toxic; and that in some cases which clinically are dermatophytosis of the hands, local infection is not present at all, but the whole eruption is toxic, the source of the toxin being a deep tinea of the feet.

DISCUSSION

DR. A. M. H. GRAY, London: It is not often that one has the privilege of hearing the results of such remarkably minute clinical investigations as Dr. White has reported, and such excellent laboratory investigations as Dr. Weidman has made.

In England, of course, epidermophytosis has been recognized for many years, and it was known to come from India. The Anglo-Indians of the better strata of society frequently came back with this complaint. In London, in 1912, a discussion on the subject took place, at which Sabouraud was present. This was about a year after he and Whitfield had independently described the fungus in the feet lesions. The lesions appeared almost entirely in private practice. Many of the patients were public schoolboys (I use the term in the sense in which it is used in England), college students and persons belonging to athletic clubs. In addition to these there was a group of hospital patients who were chiefly confined to institutions, particularly the tuberculosis sanatoriums. It so happened at that time I had an epidemic of ringworm of the groin among students in my hospital. I thought that it could be traced to the bathroom in the medical school, and at that time rather attributed it to the promiscuous use of towels. I later learned that there was not any mixing of towels at all, that each person used his own. When a little later it was realized that the ordinary persons who developed this disease were those who used bathrooms, and that those who did not develop it did not use bathrooms, one came to wonder, when the feet were so largely infected, whether the floor of the bathroom was not the place where it was transmitted from one to the other.

I was therefore greatly interested in Dr. Weidman's theory concerning the different forms of glandular secretion about the feet. Is it not possible, however, that the fourth interdigital space is attacked because of its anatomic position? The little toe is nearly always pushed round so as to lie partly under the fourth toe, and this forms a moist channel up which the fungus can grow. It seems

to me that the fungus may settle on the ball of the great toe, and yet that it is not a suitable place for it to grow. If it gets into the space next the little toe where there is moisture, it can grow easily. I think the spread, as Dr. Weidman says, is always from the toes to the groin.

Another point I should like to say a word about is the question of treatment. Dr. White said that in England physicians rely almost entirely on Whitfield's ointment. I think that is not quite accurate, and for the sake of my colleagues I would like to deny it. At the same time, I do still use Whitfield's ointment a good deal. I think the best results are obtained by some form of dry treatment. I do not mean in cases in which there are vesicles but in the ordinary intertriginous case. My treatment consists of alternating Whitfield's ointment with a dry application, using 3 per cent salicylic acid with talcum powder. At the same time I tell the patients to soak their feet night and morning, and instruct them as to rubbing away the scales with gauze, and I often have the patient come in and remove as much of the dead skin as possible. In my experience that has given better results than anything else. I do not say that it is the only satisfactory method of treatment, but in my hands it has given better results than the stronger antiseptics. I am glad to hear Dr. Weidman's suggestions about other methods of treatment, and hope they may bear fruit. In the vesicular type I am using largely solutions of acroflavin in a strength of about 1:1,000 and potassium permanganate 1:4,000, together with the roentgen ray.

Dr. William Allen Pusey, Chicago: It seems to me that these papers represent the highwater mark of erudition in dermatology. While Dr. Weidman was reading his paper I dare say many were impressed by the great complexity of the subject and the difficulty of being able to make one's way through the confusion of details in the recognition of the large number of subspecies and varieties of pathogenic fungi; certainly I felt that way. And I should perhaps have felt disheartened had it not been because of an article I read recently by two of the most eminent American mycologists regarding the confusion in mycology arising from the efforts of the systematists to subdivide the fungi, on the basis of their morphology and cultural characteristics, and to give names to the infinite forms so erected into specific varieties. These men were making a plea for less effort over the formal classification of the ringworm fungi and less efforts at fine distinctions in nomenclature. They call attention to the fact that the fine distinctions by which the separations are being made are unstable; that there is being built a highly complex structure of classification which is of uncertain solidity, and that this is leading to much confusion. In the mycology of these skin conditions dermatologists are not only getting beyond their depths, but beyond the chartered waters of mycologists themselves. To those who are groggy on the subject—and I think almost every one must be—there is great comfort in this, and it suggests the highly comforting idea that from the standpoint of dermatologists one can safely rest on this fact: Recognizing these clinical conditions and their mycotic origin, the question of the absolute classification of the fungi involved can be left to mycologists to fight out among themselves.

I do not mean to imply by this that the work of Dr. Weidman is not of the highest scientific value. It is only by such work that the problems will finally, be settled, but, in the meantime, one can take some comfort in the fact that all of the fine details of classification of the many subvarieties is of academic interest and does not interfere with the practical control of the conditions.

In regard to naming these organisms, I have some definite ideas on the subject in general. The paper which I have referred to called attention to the fact that a group of sound mycologists could probably arrange a classification of a fungi that would be satisfactory in the present state of knowledge based on general scientific usage since the time of Linnaeus. Attempts to rename species and

varieties that have had established names can only lead to confusion. Since the time of Hippocrates, systematists who wanted to establish a nomenclature based on classification have been deploring the fact that they could not get rid of established names. Established names can no more be disposed of than can historical facts, and utter confusion is the only result from attempts to rename objects which already have well established names in scientific literature. Names are given before objects are classified and these names stick; and it does not make much difference what the name is, provided all know its meaning and use it. It does make a great deal of difference if there are several names applied to the same thing.

Dr. Jay Frank Schamberg, Philadelphia: There are two phases of this subject which are of special interest—the clinical recognition of these mycotic conditions and their successful treatment. Cases are seen from time to time in which a diagnosis cannot be made by the eye and, indeed, not invariably with the microscope. The laboratory investigations of the type carried out by Dr. Weidman may merely represent refinements in mycologic study; on the other hand, one never knows when the knowledge gained may lead to practical results in treatment. Some years ago Dr. Kolmer and I carried out some work on the chemotherapy of fungus infections. We found great differences in the inhibitory effects of various chemical compounds on the growth of ringworm cultures in vitro. Salicylic acid had a low fungicidal value; its clinical effects must be due to its power to cause exfoliation of the horny layer of the skin.

Ringworm fungus can be killed rather readily in the test tube. Dr. Greenbaum and I have recently made some studies of the viability of the fungus when subjected to various antiseptics. We saturated hose fabric with a bouillon growth of epidermophyton and placed this in various concentrations of nitrate of silver, formalin, carbolic acid and other well known antiseptics. Weak solutions readily sterilize the fungus. Boiling in water for ten minutes likewise kills the fungus. Strong antiseptics are not necessary. The refractoriness of epidermophytosis is probably due to the fact that the remedies do not penetrate deeply enough.

Perhaps antiseptics soluble in alcohol will give a greater degree of penetration. I have had a reasonable degree of success from prolonged immersions of the feet in a 1:2,000 hot solution of potassium permanganate.

Dr. Oliver S. Ormsby, Chicago: Practically all of the important points have been brought out in the preceding discussion, and there is little to add.

Regarding the clinical description, I think Dr. White's description is excellent and that he covered the ground thoroughly. I saw a patient in whom I was able to watch the development of the lesions on the trunk, and it was a little different from any other that I have seen described. In that case the first lesions were wheal-like. Within two or three days they became scale covered, and within a week presented the appearance of lesions of pityriasis rosea. After that they spread peripherally and produced large patches. This patient had had ringworm of the hands and feet of the keratotic type for a number of years, with recurrent attacks on the trunk. A similar fungus was found in all the areas.

In my original article, one of the patients whose case was reported had had the infection for thirty-two years, so the duration of the disorder may be prolonged over an indefinite period. In two recurrent cases which were under the observation of Dr. Hyde and myself the patients came to the office for more than thirty years with recurrences each summer. These occurred in a man and wife, and we considered the disorder an example of dyshidrosis. When it was found that they had ringworm infection, appropriate treatment was employed and the disease was eradicated. Every effort has been made to determine the location of the micro-organisms during the time when symptoms are not present.

They have been found in the winter in the fourth interspace, when the patients did not have any symptoms. I have also found them under the toenails, as every one else has, and also in a place not ordinarily mentioned, in ordinary callus. In these cases the callus apparently was not produced by the micro-organisms.

In a country club in which many cases developed every one was advised to wear wooden sandals to and from and in the shower. This plan is thought to have prevented the spread of the infection to some extent. Objections have been raised to each of the terms applied to these infections, and it is difficult to apply a name that fulfils all the requirements. The same difficulty is found in the yeast infections. In the well known interdigital form, objection has been raised to Fabry's term "erosiointerdigitalis blastomycetica" by those who consider the causative fungus to be thrush. To avoid confusion it is essential for purposes of description and report that scientifically correct terms should be evolved for the different fungus disorders.

I think it would be well if we had more workers like Dr. Weidman. I was much pleased to see that he did not add several new families of fungi but that his tendency was to restrict their number.

Relative to Dr. Williams' paper, it appears to me that the present conception is perfectly correct. There has been a great deal of work done with the trichophytides and there does not seem to be any doubt about the fact that when kerion has been present for some time, the micro-organisms produce a sensitization of the skin, and when dissemination occurs they are quickly destroyed. That is why they are not found in the cutaneous lesions. They are present early and then disappear. They probably would be found in all the lesions if the examination was made at the right time. They have been found in the blood on many occasions, which shows that they are blood-borne. The same principle should apply to the formation of cutaneous lesions occurring in connection with ringworm of the hands and feet. Dr. Williams' several papers have brought out very well the analogy between trichophytides and dermatophytides.

I have had the same experience that every one has in treatment, and I believe that the chief trouble is not in the management of the individual case but in the prevention of recurrence.

Dr. Howard Fox, New York: My humility after hearing these excellent papers is greater than that which Dr. Pusey can possibly feel. The prevalence of fungus infection is now recognized by the dermatologist though the general practitioner does not yet realize this fact. It seems to me that the war has had an effect in increasing its prevalence. Ideal conditions certainly were afforded during the war for disseminating fungus infection, so many men being crowded together and walking barefooted on the same floors, etc. Some of the increase may be only apparent and really due to the present greater skill in recognizing the disease.

In many cases the diagnosis can be made easily, both clinically and microscopically. In the eczematoid types on the hands and feet, the diagnosis is not always easy. In most cases it is difficult to demonstrate fungus microscopically. In my experience, when the microscope fails, it is seldom possible to obtain successful cultures.

In regard to treatment, I hope that something will be accomplished by mercurochrome-220 soluble. I was glad to hear Dr. Gray say that he still uses Whitfield's ointment, as I think it frequently is of great value. I also use roentgenotherapy in combination with Whitfield's ointment, especially on the feet. I am familiar with Dr. MacKee's view about using irritants in connection with the roentgen ray, but think that in the treatment of obstinate fungus infection of the feet, the possibility of producing a few telangiectases is permissible.

Dr. Weidman spoke of the nomenclature. It seems to me that the use of the term dermatophytosis is better, perhaps, than epidermophytosis, which suggests that the condition is due to the epidermophyton.

Dr. Sigmund Pollitzer, New York: More than a score of years ago, I showed before this association a collection of some beautiful cultures, many of which I owed to the courtesy of Sabouraud.

In regard to treatment, the principles should be: first, peeling off the surface and keeping it peeling; second, interrupted sterilization. The fungi on the surface can be killed easily by a great variety of antiseptics, and by peeling off the surface, organisms superficially located can be removed. Then a case appears to be cured, but it recurs because all the spores have not been removed. The treatment should be desquamation first. Salicylic acid does this, as does the roentgen ray. For killing the organisms, especially in the acute cases, I have been using a solution of copper. This, as is generally known, is a fatal poison for all fungi. A solution of 1:1,000, or 1:1,500 in the more acute cases, put on as a wet dressing at night, and the gauze saturated with the solution being covered with oiled silk or rubber tissue, gives good results. I keep this up until the condition suggests to me approximate healing. Then I go on with Whitfield's ointment for two or three weeks. Then I do nothing for a week or ten days, after which I begin treatment again with the salicylic benzoic acid salve. I treat the patients for a week or ten days, then stop for a week or ten days, and then treat them again. When the patient seems well I do not take it for granted that he is well, but insist on his treating the previously infected area interruptedly for a week or ten days at a time, over a period of three months or more. By means of these intervals of rest one gets beyond the spore into the mycelium stage, in which the organisms are much more susceptible to the remedies.

Dr. Louis B. Mount, Albany, N. Y.: In the first issue of the *Italian Archives* there is an interesting article by Prof. U. Rebaudi regarding a case of blastomycosis in which he employed roentgenotherapy, iodides and so forth, without result. He then adopted the idea of making use of a broth vaccine, prepared according to the method of Besredka and applied locally. His results were remarkably good, judging by the photographs which accompanied the article; this may be a lead in the method of treatment of these cases.

Dr. Erwin P. Zeisler, Chicago: This disorder appears principally in summer and I have found cold applications to be more effective than hot applications. I have noticed that in some cases there was a rapid change following the application of ice. I think ethyl chloride is helpful. In the vesicular type cutting off the top of the vesicle with a pair of scissors and using a curet in removing the substance, I think, has been recommended by Sabouraud.

Dr. Henry H. Whitehouse, New York: Dr. White's description was most minute and illuminating, and it was of great interest and benefit to me. Dr. Weidman's work speaks for itself. This is work along the right line, and from such work progress and advances are made. I am sure that the paper of Dr. Williams touched on a line which is most interesting, and that it will lead to further knowledge in regard to the general effect of the fungi. I know that Dr. Pusey always does the best he can to clarify matters for the general practitioner, but I am sure he feels as I do that it is from the careful, detailed and scholarly work such as Dr. Weidman is doing, that one learns about these things. Dr. Weidman showed us slides tonight in which there was great variation in the same fungi. I am sure that further study along this line will be of great assistance in clearing up the confusion of this subject. It is a great field for him to tackle, but I am confident that he will eventually solve it.

DR. HERMAN GOLDERBERG, New York: I would like to ask whether Dr. White ever saw lymphangitis in any of his cases, a complication which I have observed in several instances.

DR. C. GUY LANE, Boston: There is one phase of this subject which is assuming importance, and which I think will soon assume more importance in the workmen's compensation laws in the different states. This was impressed on me recently in an article reporting 522 cases of skin diseases referred to an industrial clinic. Of these 522 cases suspected of being industrial, 147 were quite definitely thought to be industrial. In that group there were twenty-one cases in which the diagnosis of epidermophytosis was made. I do not believe that all those cases by any means were industrial in origin, but the fact remains that the diagnosis was made, and that they were suspected of being industrial.

Furthermore, I believe that in the cases of epidermophytosis due to injury two classes will be found. In the first group are cases in which the industrial factor is the prime consideration. In the last year I saw a man who was a wool puller in one of the shops in Boston, who had, I believe, a fungus infection due directly to his work.

There is another group in which the infection occurs as a complication of a preexisting injury or dermatitis of industrial origin, but these infections will be classed as due to injury, and for them compensation can be claimed. I have seen a case of this type in a treer in a shoe shop who had a definite dermatitis associated with his work. The condition cleared up almost completely and then intradermal vesicles developed on the lateral surfaces of the fingers, with fairly sharply outlined patches on the hands. I was not able to obtain the fungus in this case, as I was in the first, but still I reported it as a definite complication of industrial disease. I believe that this is by far the largest of the two groups that I have mentioned, for I have seen several such cases.

I think the importance of dermatophytosis in its relation to industry should be stressed out of fairness to the persons who may have the disorder, and also to the companies themselves.

DR. CHARLES J. WHITE, Boston: Dr. Gray spoke of the greater prevalence among private than among public patients. I agree that the disease is much more prevalent among the well-to-do classes than among the poor. He also spoke of dirty feet. It is perfectly extraordinary how dirty some feet are, both in public and in private practice, but the patients with dirty feet do not seem to develop the disease. The predilection for the fourth interspace of the toes certainly can be accepted on anatomic grounds. The little toe is squeezed out of normal shape by the shoes worn. This means trauma, heat, moisture and abrasions, and under these circumstances the organisms can easily penetrate. I think with Dr. Gray that much more is gained by drying the lesions up than by plastering them with ointment.

As to whether the organism must be found before the diagnosis is made, I used to say it should but now I do not. I think that the fact that an organism may be found in one lesion and not in the one beside it means that it is not necessary to demonstrate the organism in every separate patient.

Dr. Schamberg spoke of the tests of Dr. Weidman being done in the test tube. I am not sure that Dr. Weidman's tests were made in the test tube, or whether they were made in real life. Dr. Schamberg also referred to hot permanganate of potash. That I esteem highly, but think it does not compare with mercurochrome-220 soluble. It is interesting that all have their pet remedies. One can use them with success and another cannot. Everything that has been mentioned that has been tried in Boston, and yet they all seem to be of value to some.

Dr. Fox spoke of the war increasing the disease. No doubt he is right, but I think it is a question whether it was not the use of wool, the fatigue and poor general condition of the soldiers which made the disease more prevalent than ever before.

Dr. McEwen asked about dyshidrosis. I do not know that I am right, but I do not think it exists.

Dr. Pollitzer has spoken of recurrence. I always insist on the patient keeping up the treatment for a long time after the disease has disappeared outwardly, as Dr. Pusey told me he did. I think this is necessary. Dr. Pollitzer also spoke of using copper. I have tried it in solutions of 1:250, and in some cases have succeeded in getting good results.

Dr. Mount spoke of vaccine. That has not been tried in Boston. It has not been successful in the past and has not been taken up.

Dr. Zeisler suggests ethyl chloride, and I will try it. I have not yet done so.

Dr. Goldenberg asked about lymphangitis. I am sorry I did not include that in the paper but I have seen it in great severity, sometimes running up the legs from the toes.

Dr. Lane's remarks about the industrial relationship are right. The men working in wool and in leather, and any one who traumatizes himself in any way, of course, lay themselves open to invasion by the micro-organisms.

Dr. Fred D. Weidman, Philadelphia: I cannot share the optimism of many of the speakers regarding the value of this heat treatment. I have tried to warn you that these experiments are reported quite prematurely, for I have made only two tests clinically.

Dr. Williams' paper has not received the attention it deserves. Thus, I have been skeptical about the dermatophytides for a long time, because whereas there is a mass of quasistatistical and circumstantial data that seems to bear out the existence of the dermatophytides, there has not been enough experimental work done, such as attempting to reproduce them. Dr. Williams deserves great credit for his application to this subject, and for having accumulated evidence which almost convinces me of the validity of the dermatophytides.

Dr. Pollitzer mentioned the importance of fractional sterilization. I have several cases now under observation (and, incidentally, this brings up what Dr. White said about things in the test tube, but not on the skin) which have not yielded to treatment. Even Glaze's treatment failed. Thus, the students applied salicylic acid (35 per cent) for thirty-six hours, after which a layer of epiderm one-fourth inch (0.6 cm.) thick could be scraped off. I have seen it come off as a cast of the foot. Then the heat treatment was started, it was proposed to sterilize the feet intermittently. From what is known of the habits of the fungi in the test tube, I should say that treatments one week apart would be sufficient for that purpose.

The subject of dyshidrosis was discussed in extensio at the recent French conference to which I alluded. Any who are in doubt about it would be still further in doubt after reading the opinions of the Frenchmen. Just as many believed that there was a true dyshidrosis as did not believe it. Bloch stated that he had produced primitive lesions on his own hand with the fungus.

I would suggest that if the fungus is not discovered on first examination glucose dressings should be applied with the idea of offering a pabulum to the organisms and coaxing them to grow. I have succeeded two or three times in this way. I have tried it on the scalp cases in an effort to get the organisms into a more vegetative stage, with the hope that it would then be more vulnerable to the antiparasitic applications. The attempt was unsuccessful.

As to the vaccine treatment, I have declined one request to make vaccine, because I thought the experience with the scalp cases had discredited the method.

A further point about the trichophytides. It must be recalled that in the extremely suppurative conditions of the scalp there are other elements present besides the fungus—disintegrated collagen, the nucleoproteins and other products of degenerate leukocytes, more or less disintegrated hair shafts, and so on. I would intimate here that other substances than the fungus could account for the allergic or other effect which is regarded as the lesion of dermatophytide—every one can recall the surgical scarlet fevers seen in the surgical wards in appendix, mastoid and other suppurative postoperative cases. I would suggest that tests be made to determine whether dermatophytides may be reproduced by injecting the autolytic or disintegrating hair shaft substance, etc.

I did not make my paper as strong as I felt regarding new names for fungus species. It is a risky procedure and should be essayed only after long experience I have never named a new human species. In my paper I used the word iconoclastic to describe my attitude toward the validity of many fungus species, but I hope it did not quite amount to iconoclasm in regard to remaining fungus diseases of the skin.

Dr. Charles M. Williams, New York: Dr. Schamberg spoke of the difficulty of diagnosis and I wish to emphasize that point. In the cases affecting the feet, the organism has been found so many times and the symptoms described so carefully that one is fairly safe in making the diagnosis in spite of negative observations. The eruption on the hands often resembles so closely that on the feet that one is warranted, for therapeutic purposes, in making a diagnosis on inspection, but with much less certainty than in the foot cases. For scientific purposes there is warrant for making a diagnosis and for reporting cases only when the organism is demonstrated, either with the microscope or by culture. This is new ground. Nobody knows what forms tinea of the glabrous skin may assume, or what other morbid processes may simulate the eruptions caused by tinea. In the present stage of knowledge a diagnosis is often absolutely impossible and advance shall be made only by the most careful correlation of clinical and laboratory observations.

Dr. Weidman referred to the discussion in Paris where the long conference took place regarding dyshidrosis. Sabouraud says there is such a thing, having nothing to do with tinea, and that there are other toxins besides tinea which may produce dyshidrosis, and I believe he is right. Tinea of the glabrous skin beyond the hands and feet assumes such bizarre forms that I would not feel warranted in calling anything on the skin tinea unless I could demonstrate the organism. In the old-fashioned kind perhaps, but in the other types I think one goes too far in calling things tinea because a man happens to have tinea of the feet. There may be two or three different types of lesions and all of them are not known by any means.

Dr. White spoke of epidermophytosis sparing the hair. The epidermophyton does spare the hair, but Dr. Weidman and others have shown that the eruption which Dr. White calls epidermophytosis may be caused by a trichophyton and the trichophytons do not spare the hair. Dr. Stokes has just shown us a case involving both feet and scalp.

In regard to the name, I do not like epidermophytosis, as it leads to confusion. In medical literature "trichophytosis" is used to designate an infection caused by a trichophyton, "microsporosis" for an infection caused by a microsporon and, to be consistent, "epidermophytosis" should be used only for infections caused by an epidermophyton. A general name is needed, therefore, to include these eruptions which may be caused by a trichophyton, an epidermophyton or other organisms. I think tinea is as good as any and it has the advantage of being short.

PRESENT STATUS OF NONSPECIFIC TREATMENT IN DERMATOLOGY *

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I sometimes wonder what it is that brings physicians to medical meetings. I believe that some attend these meetings with the hope, not unjustifiable perhaps, that the heavens will open and shed a great light on the dark places of science; others, perhaps most, come in search of help in the problems of their daily practice. All are disciples in both the art and the science of medicine, and a meeting is not successful unless one can sit at the feet of both. It has sometimes been asserted that the art leads the science and that the empiric of today is the scientific of tomorrow. That may be true occasionally, but the progress of medicine has more often been marked by the loosening of the shackles that bind physicians to empiricism. No matter how scientific may be the trend, there is nothing so convincing of truth as its successful application. Indeed, this is the ultimate test of all truth, and sometimes the only test to which it can be put. There is a limit beyond which scientific explanation cannot go, and one comes eventually against the theory of the electron or the law of gravity, only justifiable because they explain familiar phenomena; or one stops short, appalled at the intricacy of the mechanism known as life, beyond which only the most ardent ever hope to go.

In medicine it sometimes happens that the scientific explanation when weighed in the balance is found wanting. More often the phenomena of disease and therapeutics are not susceptible of explanation. Empiricism, driven out of one field, arises in another, for treatment that cures or ameliorates cannot be shaken by any storming of science.

In dermatology the treatment must be empiric. From time immemorial diseases of the skin have been treated by methods at which pure scientists might scoff. Many dermatoses will continue to be so treated. Why certain germicides fail, and why they succeed in certain cases only, is fundamentally the same problem as in medicine generally. It must be believed that the entire cause and nature of disease has not been revealed in any instance, and that physicians are so accustomed to individual variations in manifestations and in reaction to treatment that they have almost ceased to question them. This is true particularly of

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* From the Section on Syphilology and Dermatology, Mayo Clinic.

* Read at the joint meeting of the Chicago Dermatological Society and the Mississippi Valley Dermatological Society, Chicago, Jan. 12, 1927.

nonspecific treatment. The results are uncertain and inconsistent, and have but little established scientific basis. Even the scientific facts are not numerous, and a review of the subject at present can give little but an appraisal of the clinical results.

Since the established scientific facts concerning the mechanism of nonspecific protein treatment are not numerous, a review of the subject at present must consist mainly of an estimate of clinical accomplishments. These results are often impressions rather than proved and controlled data. No doubt, this inability to control the method thoroughly accounts for the scarcity of reports in recent literature, notwithstanding the fact that probably every one has used this form of treatment in one or more of its various modifications at some time or other.

My interest in heterotherapy has been maintained (1) by the encouragement which the reports of observations made by internists, ophthalmologists and urologists have offered; (2) because from time to time valuable therapeutic results have been produced in a case of dermatosis, and (3) because I was seeking relief for some of the resistant and intractable diseases of the skin for which there is so little to offer. To those who forsook this method of treatment or to those who have not been interested because of the lack of enthusiasm of others, this report will no doubt be a review of well known experiences; for those who are still interested I have endeavored to correlate briefly the present conception of the mechanism of nonspecific treatment, the results reported by dermatologists during the last ten years and my own experiences.

The suggested theories of the mode of action of nonspecific treatment are numerous. The accepted hypotheses, in the order of their development, are briefly the following: Herrmann [1] believes that any protein injected intravenously serves as a stimulus for the liberation of specific antibodies when the previously injected antigen is unable to cause such liberation. Larson [2] has applied the term specific or exfoliative stimuli in describing the action of the antigen which causes the tissue cells to throw off these antibodies, and he believes that an antibody is a liability as long as it is sessile and attached to body cells. Zimmer [3] was one of the first to call attention to the fact that the choice of the agent used was of secondary importance. He emphasized the need for determining the strength of the stimulation, bearing in mind that the degree

1. Herrmann, S. F.: Liberation of Antibodies on Injection of Foreign Proteins, J. Infect. Dis. **23**:457-469, 1918.

2. Larson, W. P.: Principles of Foreign Protein Therapy, Minnesota Med. **2**:332-334, 1919.

3. Zimmer, Arnold: Schwellenreiztherapie, Berl. klin. Wchnschr. **1**:508-510, 1921.

of the reaction varies with different diseases and patients. On the other hand, Weichardt [4] suggests that the proteins act by activation of the protoplasm, although such activation does not always cause stimulation but may produce paralysis of the body cell. For this reason stimulation and activation of the cell are not synonymous. Freund [5] explains the mechanism of nonspecific treatment on the basis that the decomposed cells themselves may be the active agent or that the ferments produced by the decomposition act on protein which is then the active substance. In the most extensive and recent review of the principles, Clark [6] adheres to the belief that the active agent is a product of protein decomposition. The washing of the tissue fluids into the circulation produces a number of changes in the blood such as leukopenia, immediately followed by leukocytosis with an increase in the young and atypical erythrocytes and platelets; an increase in fibrinogen, globulin, thrombokinase and blood sugar, in the nonprotein nitrogen content, in the proteolytic ferments and antibodies, and, finally an increase in the permeability of the cell membranes and the capillaries. Schamberg and Brown [7] reported an increase in the lipase and protease in the blood and, recently, Ling [8] studied the mobilization of blood antibodies by measuring the agglutinin titer, opsonic index, bacteriolytic activity and methods of complement deviation, besides observing the influence of various agents on the mobilization of the blood enzymes.

Because it has been shown that a single factor does not stand out as the cause of the mechanism by which the agents used have accomplished the therapeutic results, I have made a list of the various substances reported used by dermatologists, grouped according to their source.

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4. Weichardt, Wolfgang: Ueber Proteinkörpertherapie, München. med. Wchnschr. **1**:107-108, 1922.

5. Freund, H., and Gottlieb, R.: Ueber die Bedeutung von Zellzerfallsprodukten für den Ablauf pharmakologischer Reaktionen, München. med. Wchnschr. **1**:383-385, 1921.

6. Clark, A. J.: The Scientific Basis for Nonspecific Protein Therapy, Brit. M. J. **1**:315-316, 1923.

7. Schamberg, J. F., and Brown, Herman: Effect of Various Agents, Ultraviolet Light, Vaccines, Turpentine, Neoarsphenamine and Autoblood Injections on the Enzymes of Blood and Skin, Arch. Int. Med. **35**:537-548 (May) 1925.

8. Ling, C. Y.: The Mechanism of Reaction of Nonspecific Protein Agents in the Treatment of Disease: I. The Influence of Various Agents on Temperature and Leukocyte Counts in Normal Persons and in Rabbits, Arch. Int. Med. **35**:598-608 (May) 1925; II. The Influence of Various Agents on the Mobilization of Blood Antibodies, ibid. **35**:740-751 (June) 1925; III. The Influence of Various Agents on the Mobilization of Blood Enzymes in Normal Persons and in Rabbits, ibid. **35**:752-759 (June) 1925.

AGENTS USED

Bacterial and Protozoan	Vaccines of all types, serums, toxins, bacteria, yeasts, nonpathogenic intestinal parasites, *Plasmodium vivax*, *Spirochete refringens*, Coley's fluid, tuberculin.
Chemical	Proteins, protein split products as proteose, nuclein, peptones, albuminoses. Turpentine, mercurochrome-220 soluble, iodides, sodium chloride, distilled water, colloidal preparations of metal, crotalin, neoarsphenamine.
Animal	Polyglandular extracts, tissue extracts, horse serum, bee toxin, milk, milk preparations such as aolan.
Vegetable	Pollen toxins and extracts.
Mechanical	Roentgen ray, radium, cautery, trauma and blood letting, ultraviolet light.

Various proprietary preparations.

REPORTS OF DERMATOLOGISTS

It is difficult to evaluate the results reported by European dermatologists because they have used different agents and have not followed any particular system of treatment. However, in the main, they agree that it is necessary to produce a systemic effect, with chill, fever and malaise, and that the agent used in obtaining this effect matters but little. Löwenfeld and Pulay [9] reported a series of cases of deep seated trichophytosis in which they used specific (trichon), nonspecific (tuberculin) and chemical (turpentine) agents with the same results in all three groups. Gow [10] temporarily relieved psoriasis and lupus erythematosus; Ambrosoli noted favorable results in dermatitis herpetiformis, eczema, pemphigus, lichen ruber, furunculosis and dermatitis seborrheica, but none in psoriasis or parapsoriasis. Klingmüller [11] was enthusiastic about turpentine in the treatment of the staphylomycoses, lichen ruber, lupus erythematosus and pemphigus. Gawalowski [12] cites

9. Löwenfeld, Wolfgang; and Pulay, Erwin: Zur Frage der spezifischen und unspezifischen Therapie der Trichophytie, Wien. klin. Wchnschr. **32**:498-502, 1919.

10. Gow, A. E.: Intravenous Protein Therapy, Brit. M. J. **1**:284-287, 1920.

11. Klingmüller: Zur Behandlung der Haut- und Geschlechtskrankheiten mit Einführung unspezifischer Stoffe, Arch. f. Dermat. u. Syph. **138**:169-175, 1922.

12. Gawalowski, K.: Intracutaneous Injection of Milk, Cěská dermat. **3**: 147-150, 1922.

the value of the method in the treatment of deep parasitic sycoses, but the results were negligible in the coccogenous types. Golay,[13] in a review of the French dermatologists' experiences, reported noteworthy effects in acne, furunculosis, pyodermia, sycoses, cold abscess, erythroderma, trichophyton, zoster, psoriasis, eczema and pruritic conditions.

This review of European experience gives the impression that the results of nonspecific treatment are not startling but that the infectious diseases show the greatest improvement. In this country the reports have not been numerous. Engman and McGarry [14] have recorded their favorable experiences with typhoid vaccine in cases of psoriasis and lupus erythematosus, exfoliative dermatitis and parapsoriasis; only slight benefit followed its use in cases of dermatitis herpetiformis. Culver [15] recorded satisfactory response in the recurrent pyogenic infections, and cure in a case of psoriasis. More recently Engman[16] found that good effects followed nonspecific treatment in cases of large spored ringworm. Kingsbury and Bechet [17] called attention to the occasional nonspecific effects of blood letting in cases of psoriasis, erythema multiforme and dermatitis herpetiformis and its value in the treatment of urticaria.

A review of this type does not permit a discussion of a most vital phase of this subject, namely, the relationship of the skin per se to nonspecific resistance. Those who are interested in this comparatively unexplored field, are referred to the book by Peterson,[18] who has summarized the data published up to 1922.

PERSONAL OBSERVATIONS

With the present meager knowledge of nonspecific treatment, despite the many theories mentioned, it must still be regarded as empiric. Approximately 200 patients in my service have been treated by this method, and the results are appraised solely on a comparative basis. As it is impossible to estimate in percentages the benefit derived, I have graded the results as good, fair, slight and negative.

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13. Golay, J., and Starobinsky, A.: La proteinotherapie en dermatologie, Ann. de dermat. et syph. **6**:248-259, 1925.

14. Engman, M. F., and McGarry, R. A.: The Treatment of Certain Diseases of the Skin by the Intravenous Injection of a Foreign Protein, J. A. M. A. **67**:1741-1745 (Dec. 9) 1916.

15. Culver, Henry: Intravenous Protein Injections in Urology and Dermatology, J. A. M. A. **76**:311-312 (Jan. 29) 1921.

16. Engman, M. F.: Large Spored Ringworm Infection; Treatment with Foreign Protein Injections; Beard and Scalp, Arch. Dermat. & Syph. **13**:352-358 (March) 1926.

17. Kingsbury, Jerome; and Bechet, P. E.: Venipuncture in the Treatment of Certain Diseases of the Skin; Its Value as an Occasional Adjuvant, J. A. M. A. **75**:937-939 (Oct. 2) 1920.

18. Peterson, W. F.: Protein Therapy and Nonspecific Resistance, New York, The MacMillan Company, 1922.

Good Results.—The outstanding results have been obtained in the cases of bacterial disease with severe systemic involvement. The use of horse serum in the treatment of anthrax, aided by immobilization, without recourse to surgical measures, has been highly gratifying. Likewise, the results noted in the majority of patients with erysipelas following the use of a polyvalent vaccine have warranted its use as a routine, after the gamut of therapeutic measures suggested for this disease has been covered without success. The crises in temperature and the recession of the process after one or two injections of the vaccine have not been without significance on numerous occasions. In erysipeloid, the mixed vaccines brought about more rapid cessation of the process than other methods used, although the results were by no means phenomenal.

Fair Results.—Less favorable results have attended the use of typhoid vaccines in the staphylococcic sycoses, pyodermia and ecthyma. The effects were transient, and as a rule were followed by recurrence. In two cases of acute erythema nodosum in association with arthritis, the lesions disappeared immediately and completely, and relief from the joint pains lasted for ten and fourteen weeks, respectively. Relapse was of about the same intensity in each and continued in spite of repeated inoculations with typhoid vaccine. I believe some of the effects produced in the treatment of papulonecrotic tuberculids by means of neoarsphenamine, as suggested by Stokes,[19] are as fairly attributable to a nonspecific reaction as to the tonic effect of the arsenic. Particularly is this true if the injections were attended with febrile reactions. Although not infallible this is still at times a satisfactory method of treating tuberculids. I have not had any experience with the use of tuberculin in this disease. My results in the treatment of the large spored ringworm by vaccines and nonspecific measures have not been satisfactory. It has been suggested that the results of the roentgen ray in this disease are due to a nonspecific reaction.

At Goeckerman's [20] suggestion, the chronic and subacute forms of disseminated lupus erythematosus have been treated by roentgen rays, directed to the lymphatic areas for the nonspecific effect. This form of treatment has been followed by remissions more pronounced than in other methods undertaken. In the acute febrile types of the disease the reaction following roentgen rays is alarming at times and has been reported as fatal.

Dermatitis herpetiformis has shown temporary cessation after treatment with autogenous serum and also with mercurochrome-220

19. Stokes, J. H.: Clinical Studies in Cutaneous Aspects of Tuberculosis: III. The Therapeutic Management of the Tuberculids, with Special Reference to the Efficiency of Arsphenamine, Am. J. M. Sc. **157**:522-539, 1919.

20. Goeckerman, W. H.: Treatment of Lupus Erythematosus by Filtered X-Ray to Gland-Bearing Regions of the Body, M. J. & Record **124**:530-533, 1924.

soluble. The disappearance of the papules and vesicles and pruritis has rewarded the nonspecific measures on a number of occasions. It is unfortunate that recurrence so rapidly follows the striking results that are obtained. A few cases of lichen planus reacted favorably to autogenous serum after they had failed to respond to the mercury and arsenic. I believe the results obtained from the use of vaccines, autogenous or other, in the treatment of acne vulgaris are based on the nonspecific reactions. Since the development of the roentgen ray in the treatment of acne, my experience has been limited to the treatment of the indurated types by specific or nonspecific measures. In two cases the results from nonspecific measures were satisfactory after roentgen rays had failed; in eighteen others the vaccine did not have any effect. In two cases of dermatomyositis, the injection of typhoid vaccine, in doses smaller than those usually given, produced a small amount of improvement. Nonspecific reactions in recurrent erysipelas, with lymphangitis and resulting lymphedema, reduced the severity and frequency of the attacks.

Slight Benefit.—Contrary to the experience of others, I have accomplished little in recurrent furunculosis from specific or nonspecific treatment, including the use of turpentine. Such treatment of carbuncles has been equally barren. The use of vaccines has brought little relief in recurrent aphthous lesions of the vulva, and actinomycosis failed to respond to nonspecific measures unless nonspecific effects are attributed to the destructive action of radium. Tuberculin in the treatment of lupus vulgaris produces a focal exacerbation followed by recession of the plaque but does not prevent the development of new tubercles. In psoriasis, the results are akin to those of all the other therapeutic measures suggested, in that, although the rapidity of involution of the plaques seems to give promise of an outstanding result, the usual recurrence follows. Autogenous serum may occasionally dissipate an attack, and six injections will usually increase the susceptibility to chrysarobin. In pemphigus, rapid involution followed the use, in two cases, of injections of milk, but rapid recurrence and death followed; the use of horse serum was without avail. Erythema multiforme responded fairly well to the milder forms of treatment such as intramuscular injections of milk and neoarsphenamine; remissions were prolonged and symptoms ameliorated. The various forms of giant urticaria also showed a temporary response to typhoid vaccine and autogenous serum, but when it was realized that this method of treating urticaria due to chronic nervous exhaustion was useless, it was discontinued. The application of deep roentgen-ray treatment to the lymphatic areas in cases of generalized exfoliative dermatitis of undetermined origin has given striking but merely temporary relief. A patient with the premycotic lesions of

mycosis fungoides obtained immediate relief from the pruritus following the second chill in a course of induced malaria; however, sufficient time has not elapsed to warrant deductions.

Negative Results.—I have not seen any benefit whatever from the use of nonspecific measures in cases of eczema in practically all of its manifestations, in the chronic form of discoid lupus erythematosus or in allergic dermatitis.

Experience has taught me that typhoid vaccine used intravenously is the most satisfactory nonspecific therapeutic agent. The dosage is more readily controlled, an essential requisite of the use of nonspecific therapeutic substances, and the constitutional reactions are less severe than with other proteins. Opinions vary as to the degree of reaction necessary; my experience confirms the European results, that the best results follow in those cases in which moderate pyrexia and constitutional manifestations appear. It is to be borne in mind that nonspecific treatment may be attended with certain risks—hence, the advisability of selecting patients who have not been too debilitated by systemic diseases. Nonspecific treatment is not to be used as a routine; but at times, in certain selected cases in combination with established and proved remedies, it accomplishes extraordinary results.

In contrast to the results in dermatology, the effects of nonspecific treatment have been more encouraging in the treatment of various malignant manifestations of syphilis, and I trust that the reported observations are but the forerunners of more remarkable accomplishments in this field. It is essential that more carefully controlled and larger series of cases be studied in detail before final judgment is passed on the treatment in dermatology.

CORRECTION

A number of errors occurred in the article by Dr. John A. Gammel on "The Etiology of Maduromycosis" (ARCH. DERMAT. & SYPH. **15**:241 [March] 1927). The corrections are:

Page 242, line 14 — Certain fungi *on* plants
line 25 — οἴδημα
Page 243, footnote 12: *à* grains noirs
Page 245, footnote 15: à la mémoire
Page 246, last paragraph: *Actinomyces asteroides*
Page 251, line 14: *emendavit* Pinoy, 1912
footnote 37, second line: madurella mycetomi
Page 255, third paragraph: Genus *Indiella*
Page 256, footnote 55: Gr*iech*enland
Page 257, first line of last paragraph: *Glenospora semoni*, Chambers and Archibald, 1917. The mycelial
Page 260, line 5: asco*s*pores
Page 278, paragraph 3, line 2: par suite *de* l'insuffisance

News and Comment

Model Cosmetic Bill.—The Association of Dairy, Food and Drug Officials of the United States adopted a model cosmetic bill at their annual convention in Washington last October, which had been prepared by a committee authorized at the annual meeting in Denver. The bill is now being presented to the various state officials with the recommendation that it be introduced into the legislature. The object of the legislation is to regulate the distribution, sale and commercial use of cosmetics to prevent their adulteration or misbranding. Section 3 of the bill states that:

"A cosmetic is adulterated within the meaning of this act if it contains any salt, compound or derivative of lead, arsenic, mercury, or of hydrofluoric acid, any free sodium or potassium hydroxide in excess of one-half of one per cent, any amine derived from coal-tar hydrocarbon, any methyl alcohol, or any other ingredient that renders its use injurious."

Section 4 of the bill states that:

"A cosmetic is misbranded within the meaning of this act (*a*) if its package or label shall bear, or any advertising matter relating to the article shall contain, any statement, design or device which is false, misleading or deceptive in any particular. (*b*) If its inner and outer package labels shall fail to bear a plain and conspicuous declaration of the presence and amounts, in accordance with the common method of expression, of such of the following as may be ingredients, accompanied, except in the case of dentifrices and soaps, by the phrase, for external use only—salts, compounds and derivatives of silver, copper, zinc, barium, bismuth, antimony, cadmium, nickel and cobalt; any oxalic acid, belladonna or mydriatic alkaloids, and any salts or derivatives of such; any pyrogallic acid, calcium sulphide, formaldehyde, aluminum chloride, aluminum oxychloride, and any free mineral acid in excess of 1 per cent."

Abstracts from Current Literature

THE KAHN PRECIPITATION TEST FOR SYPHILIS. J. G. HOPKINS and W. M. BRUNET, J. A. M. A. **88**:311 (Jan. 29) 1927.

The authors by means of a questionnaire and through reports in the literature collected records of more than 39,000 Kahn reactions which they have analyzed in regard to the value of this reaction in comparison with the Wassermann test. They believe that the present Kahn technic is much superior to the older process. In general, the Kahn reaction compares favorably with the Wassermann test; most serologists believe that it should be used in conjunction with the Wassermann reaction, but should not yet supplant it.

CHRONIC ERYTHEMA OF LEGS: REPORT OF CASE. J. KAUFMANN and J. F. MCINTOSH, J. A. M. A. **88**:388 (Feb. 5) 1927.

The authors call attention to reports in the European literature of a chronic disorder, occurring usually in young women, and characterized by painful, indurated, erythematous patches on the lower legs and ankles. The disease has some features suggesting erythema induratum.

The authors' patient was a girl, aged 18, with painful erythematous areas on both lower extremities. The patient also presented a tuberculous uveitis but no other evidence of tuberculosis. There were several recurrences of the skin disorder; the whole process lasting for months. The cause is unknown. In some instances the condition was observed in association with tuberculous disease.

RADIOMETRIC MEASUREMENTS ON THE CARBON ARC AND OTHER SOURCES USED IN PHOTOTHERAPY. W. W. COBLENTZ, M. J. DORCAS and C. W. HUGHES, J. A. M. A. **88**:390 (Feb. 5) 1927.

The article records the result of an investigation of the physics of these sources of energy. The authors found that mercury vapor lamps of recent manufacture did not show deterioration after considerable usage. The mercury arc is extremely rich in short rays, which have a rapid germicidal action. These rays have little skin penetrability. The longer rays, from 400 to 1,400 millimicrons, have a greater penetration.

The authors regard as untenable the hypothesis that the therapeutic action of ultraviolet light is due to induced fluorescence of the blood stream.

THE NUMBER OF CHROMOSOMES IN THE CELLS OF CANCEROUS AND OTHER HUMAN TUMORS. J. BELLING, J. A. M. A. **88**:396 (Feb. 5) 1927.

Belling found the chromosome number to be forty-eight in a sarcoma from a female. This is the same number of chromosomes that is found in the human female, and thus refutes the assertions that in certain human tumors the number of chromosomes is decreased.

INVESTIGATION OF INJURIES FROM HAIR DYES, DYED FURS AND COSMETICS. H. W. COLE, J. A. M. A. **88**:397 (Feb. 5) 1927.

Cole reports for the committee appointed by the American Medical Association to investigate this subject. A questionnaire was sent out, and the replies are tabulated.

Because of the lack of response to the questionnaire the results are probably not entirely representative, but they show clearly that many of the cosmetics and dyes are injurious, some dangerously so. The committee hopes to continue its work and eventually to develop legislation which will correct the situation.

CANCER STATISTICS AS THEY APPEAR TO A PATHOLOGIST. H. GIDEON WELLS, J. A. M. A. **88**:399 (Feb. 5) 1927; **88**:476 (Feb. 12) 1927.

In a special article, Wells critically reviews the statistical evidence as to the factors of environment, racial susceptibility, etc., on the frequency of cancer. The article does not allow brief abstract, but the following concluding statement sums up Wells' opinion. "At present, it seems to me, the most that we can say is that although all races and groups of human beings are susceptible to cancer, it is probable that conditions of life and hereditary constitutional factors modify the frequency with which cancer appears in different races and different nationalities or the frequency with which it attacks different organs or tissues. However, the evidence now available is too fragmentary and too poorly controlled in respect to figures on the age of the population, and too defective in thorough clinical and necropsy study, to permit of any positive statements as to the relative susceptibility to cancer of the peoples of civilized and uncivilized communities, or in the black, white, brown, red and yellow races of mankind."

TRYPARSAMIDE IN THE TREATMENT OF GENERAL PARALYSIS. S. B. HADDEN and G. WILSON, J. A. M. A. **88**:473 (Feb. 12) 1927.

The authors obtained results that are encouraging; certainly better than any they have previously seen with other arsenicals, mercury or bismuth. The clinical results far surpass the serologic improvement which takes place only after prolonged treatment. Tryparsamide produces great improvement in the physical state of the patient. Untoward effects in their series have been insignificant; they think the danger to vision is real but overemphasized. In their experience the drug produced benefit in about 40 per cent of the cases, and seemed superior to any other drug used in the treatment of general paralysis.

PURPURIC VESICULOBULLOUS DERMATITIS SUBSEQUENT TO INTRAVENOUS INJECTION OF SODIUM THIOSULPHATE: REPORT OF TWO CASES. C. N. FRAZIER, J. A. M. A. **88**:537 (Feb. 19) 1927.

In the reported cases there was a mild erythematosquamous arsphenamine dermatitis. After injections of sodium thiosulphate there was an exacerbation of the dermatitis which extended and took on a vesicobullous and purpuric character. A moderate febrile disturbance accompanied the exacerbation. The sodium thiosulphate was administered in the usual way and in moderate doses. The author attributes the untoward effect to sodium thiosulphate because the arsphenamine dermatitis was not progressing at the time the sodium thiosulphate was administered.

MICHAEL, Houston, Texas.

PITYRIASIS LICHENODES AND VARIOLIFORMIS ACUTA. J. ALMKVIST, Rev. Dermat. Argentina **11**:13, 1925-1926.

A rare case of this variety of pityriasis lichenodes in a young Austrian, aged 20, is reported. The author describes the condition as a papular eruption of symmetrical distribution. Many of the papules undergo central necrosis

resembling lesions of variola. The disease is acute, running its entire course in about six weeks and leaving depressed scars like those of smallpox. The condition closely resembles a syphilitic eruption. The pathologic condition is similar to that of psoriasis and may be classified among the parapsoriasis of Brocq. According to the author, this is the eleventh case reported in the literature.

PROPHYLAXIS OF CONGENITAL SYPHILIS. H. BOAS, Rev. Dermat. Argentina **11**:23, 1925-1926.

This is a study of the influence of syphilis on infant mortality and a plea for intensive treatment of pregnant syphilitic women.

PIGMENTATION DUE TO COLOGNE WATER. J. BRITO FORESTI, Rev. Dermat. Argentina **11**:37, 1925-1926.

The author reports forty cases of pigmentation of the face due to the use of different brands of cologne water as a toilet lotion.

GENITAL CHANCRIFORM PYODERMITIS OF THE NEWBORN. J. S. COVISA and J. BEJARANO, Rev. Dermat. Argentina **11**:45, 1925-1926.

The authors report three cases of a chancriform lesion of the prepuce in small children. The lesions closely resemble syphilitic chancres, but spirochetes are not present and local treatment is sufficient to effect a cure. In all cases there is a markedly large prepuce. They propose the foregoing name to designate this condition.

JUXTA-ARTICULAR NODULES. M. E. JEANSELME, Rev. Dermat. Argentina **11**:73, 1925-1926.

Jeanselme is of the opinion that juxta-articular nodules are of syphilitic nature. He presents ten clinical cases to prove his assertion. It is possible, he says, that frambesia may also cause similar lesions.

TREATMENT OF LEPROSY WITH ETHYL ESTERS OF CHAULMOOGRA OIL. PARDO-CASTELLO, Rev. Dermat. Argentina **11**:101, 1925-1926.

This is a report of twenty-five cases of leprosy treated for periods varying from a few months to several years. Four patients were apparently cured clinically and bacteriologically, four were clinically free from symptoms but still showed Hansen bacilli, six were greatly improved, three were slightly improved and eight did not show any improvement.

KRAUROSIS OF THE PREPUCE AND GLANS PENIS. J. PEIRI, Rev. Dermat. Argentina **11**:123, 1925-1926.

The author reviews the subject of kraurosis or primitive atrophoderma, leukoplakia and erythroplasia of Queirat. These three conditions are preepitheliomatous dermatosis of the glans penis and prepuce.

DERMATITIS HERPETIFORMIS. A. RAVOGLI, Rev. Dermat. Argentina **11**:133 1925-1926.

A general review is presented of the history, symptomatology and treatment of Duhring's disease.

SENILE CHANGES DUE TO SEBORRHEA. R. SABOUREAUD, Rev. Dermat. Argentina **11**:139, 1925-1926.

Saboureaud studies, in this article, the seborrheic conditions of the face and supports the theory that patients suffering from these diseases become

old prematurely. In many cases the proper treatment of seborrhea may return to a faded complexion its normal youthful color and suavity.

DERMATOSIS IN BRAZIL. F. TERRA, Rev. Dermat. Argentina **11**:151, 1925-1926.

Frambesia is becoming almost rare in Brazil, according to Terra. Cutaneous leishmaniosis and venereal granuloma are also on the decline because of the good results obtained with the injections of antimony potassium tartrate. Juxta-articular nodules are, in his opinion, of syphilitic nature. Leprosy, syphilis and cancer are widespread.

ETHYL ESTERS OF CHAULMOOGRA OIL IN THE TREATMENT OF LEPROSY AND TUBERCULOSIS. O. CALCAGNÒ, Rev. Dermat. Argentina **11**:179, 1925-1926.

Chemotherapeutic studies were made of the chaulmoogra compounds. According to the author, these are the preparations of choice in the treatment of leprosy at present.

CUTANEOUS MANIFESTATIONS OF LATENT DIABETES. P. ESCUDERO and F. PUCHULÚ, Rev. Dermat. Argentina **11**:231, 1925-1926.

The authors have demonstrated that many cases of eczema and furunculosis present an abnormal metabolism of the carbohydrates. The patients have a normal glycemia and never present sugar in the urine, but after the ingestion of 2 Gm. of glucose per kilogram of body weight, they show a decided temporary increase in the blood sugar. These cases respond well to treatment with insulin.

PARDO-CASTELLO, Havana.

DERMATOLOGIC ABSTRACTS

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

GENERALIZED VITILIGO. GOUGEROT, ET AL., Paris méd. **61**:432 (Nov. 27) 1926.

Gougerot, Martin and Mansion report a case of generalized vitiligo in an Arab with a probable admixture of negro blood. The disease commenced at the age of 18, up to which time his skin had presented the uniform dark brown usual in his race. The first areas of depigmentation appeared beneath the axilla. At the end of three years the depigmentation had spread over the skin of the entire body, except the face, which retained its color, save in small, scattered areas. The anterior surface of the ears was white, the posterior surface brown. The pigment was gone from the scalp, but retained in the hair, except for a few scattered hairs on the temples. A few patches of varying shades of brown were scattered over the body. The depigmentation was unaccompanied by general symptoms or by other changes in the skin or local nervous apparatus. The patient complained that he felt the cold much more than formerly and that in summer he became sunburned easily.

THE RELATIONS BETWEEN SKIN PIGMENT AND TYROSIN IN THE BLOOD. D. STEIGER-KAZAL, Arch. f. Dermat. u. Syph. **152**:420 (Dec. 3) 1926.

Steiger-Kazal found light colored skin with slight tendency to pigmentation associated with a low serum tyrosin index, and darker skin, in which the pigment augmented readily, associated with high tyrosin values.

THE BLOOD PICTURE IN LEPROSY. P. BARGEHR, Arch. f. Dermat. u. Syph. **152**:462 (Dec. 3) 1926.

Bargehr made repeated examinations over a period of years of the blood of 130 lepers in Java. He found that the chief characteristic of the blood picture is the small number of monocytes, where monocytosis might be expected. While the blood picture cannot be said to possess particular diagnostic value, it could be of use in following the course of the disease and in testing new methods of treatment. The shifting to the left is an indicator of the spread and toxicity of the lepra micro-organism, and the lymphocyte count enables one to judge the resistance of the patient.

VERRUCA SENILIS AND KERATOMA SENILE. W. FREUDENTHAL, Arch. f. Dermat. u. Syph. **152**:505 (Dec. 3) 1926.

Freudenthal made histologic studies of nine specimens of verruca senilis, removed from the trunk in men and women, aged from 43 to 75. The characteristic features of the histologic picture were the epithelial network containing in its meshes islands of connective tissue of the papillary body, spaces filled with loose horny lamellae, and moderate infiltration. In verruca senilis of the face the histologic picture is not so regular. In one type the epithelial mass, made up of broad cones with few branchings, dominates the picture. In another an irregularly formed network contains in its meshes connective tissue, and it is interrupted by horny cysts. The epithelial strands may be narrow and run parallel and close to one another, forming masses which at first glance resemble basal cell epithelioma. A sweat gland duct may be closely simulated by a double strand of epithelium, running isolated and straight downward or anastomosing with others. The following factors speak against epithelioma: The atypical epithelial proliferation is never infiltrating; it never goes below the papillary body; though considerable and varied, it keeps within certain limits and to definite forms; it does not correspond to any of the known forms of epithelioma, not even to Darier's "intermediary type"; mitoses are little, if any, increased; infiltration is moderate. The author does not consider that verruca senilis should be classed as a precancerous dermatosis. His studies on keratoma senile were made on fourteen biopsy specimens obtained from six men and seven women, aged from 34 to 76. All but two were from the upper half of the face. He found that this lesion also presents a characteristic and uniform histologic picture, with distinct differences from that of verruca senilis. In the widened, horny layer, parakeratotic columns alternate with hyperkeratotic masses. An atypical epithelial proliferation penetrates the papillary body in the form of buds or cones proceeding from the basal layer, or lies on it in the form of a band. Fissure formation above the basal layer or epithelial proliferations is frequently seen. Infiltration in the papillary body is in the form of perivascular strands and masses and consists mainly of round cells. He sees the source of all epithelial changes in keratoma senile in an injury to the mother cell of the epidermis, the basal cell, which prevents the normal process of cornification from taking place. He made a large number of excisions with the object of following the development of epithelioma from keratoma senile, but in only one instance did he find a transition stage; in this the two lesions, while immediately adjacent to one another, are nevertheless sharply demarcated. With the development of the epithelioma, the picture of keratoma senile is entirely lost.

LOCAL MYXEDEMA OF THE SKIN AND ITS RELATION TO EXOPHTHALMIC GOITER. W. RICHTER, Dermat. Wchnschr. **84**:7 (Jan. 1) 1927.

Richter discusses the literature on myxedema and on skin changes associated with exophthalmic goiter. He reports a case in which myxedema of both legs developed late in the course of exophthalmic goiter, two years after partial strumectomy. When Richter saw the patient, the myxedema had been present for one year; the heart, leukocyte picture, blood coagulation time and basal metabolism were normal, but the nervous symptoms had recently become worse. The patient died following a second operation on the thyroid. Microscopic examination of the thyroid tissue showed regenerative changes alongside typical exophthalmic goiter structure. Richter sees in this case an instance of the rarely observed third stage of exophthalmic goiter and explains the perplexing association of myxedema and similar skin changes with exophthalmic goiter by assuming that hypothyreosis characterizes this stage.

LEPROUS RHINITIS. G. PORTMANN and H. RETROUVEY, Acta Oto-Laryngologica **10**:181, 1926.

Portmann and Retrouvey describe two cases of leprosy with nasobuccolaryngeal manifestations and discuss at length the clinical aspect and differential diagnosis of leprous rhinitis. An early symptom of great value is epistaxis; the attacks are mild, but recur frequently, the latter point being the significant feature. Two forms of tertiary syphilis, diffuse infiltration and gumma of the septum, may be confused with leprous rhinitis. In syphilis the infiltration is unilateral and extends over the entire nasal fossa, while in leprosy it is bilateral and is limited to the respiratory portion. The usual site of the syphilitic gumma is the bony portion of the septum; that of the leprous gumma, the cartilaginous portion. Lupous lesions in this region are less extensive than those due to leprosy and in lupus the intense congestion of the mucous membrane is absent. In rhinoscleroma the hardness of the infiltration, the external deformity of the nasal pyramid and the pale color and atrophy of the mucous membrane are sufficient to differentiate it from leprosy. The latter has a number of points in common with atrophic coryza, but in leprosy the atrophy and fetidity are less and the crusts are smaller and lack the greenish or black color seen in atrophic coryza.

Society Transactions

NEW YORK ACADEMY OF MEDICINE

Regular Meeting, Nov. 1, 1926

M. B. Parounagian, M.D., *President*

Demonstration of Cryocautery (Lortat-Jacob). By Dr. Howard Fox.

The use of the cryocautery devised by Dr. Lortat-Jacob of the St. Louis Hospital, Paris, was demonstrated. It was explained that the apparatus was not merely a device for collecting carbon dioxide snow. A little snow was first collected by attaching the instrument to any ordinary tank, acetone was added, and the cold was conducted to the removable applicator contained within the apparatus. There were eight of these applicators, of various sizes, one of them ending in a sharp point for use in treating pinhead lesions. The advantages of the apparatus lay in the rapidity with which it was made ready for use and the fact that the freezing could be better confined to a given area, without the undesirable spreading which took place with an ordinary pencil of carbon dioxide snow. The amount of pressure used was also indicated on the instrument. A disadvantage was that each charge of the apparatus with snow enabled only one application of a given size to be used. When a different applicator was desired, the instrument had to be taken apart and recharged.

The principle of the cryocautery was not original with Dr. Lortat-Jacob; in fact, another similar French apparatus had been placed on the market. Dr. Fox was not yet convinced that this new apparatus was as effiicent as the ordinary crayon of carbon dioxide snow. He merely wished to demonstrate an apparatus that appeared to be entirely new to most of the members of the section.

DISCUSSION

Dr. Ochs: Years ago whenever we wanted to get a lower temperature we dipped the cone of carbon dioxide snow in ether. Apparently acetone gives the same result.

Dr. Eller: Last summer I had the pleasure of seeing Dr. Lortat-Jacob demonstrate this apparatus at the St. Louis Hospital in Paris. He saw about fifty cases daily, among which were such diseases as lupus vulgaris, lupus erythematosus, port wine marks, callosities and plantar warts. The results were splendid. I have treated a few patients who had port wine marks with this instrument and have been gratified with the results. Carbon dioxide snow may be applied to a wart and the lesion curetted without an anesthetic, since the extreme degree of cold desensitizes it.

Dr. Cannon: I saw this method demonstrated two years ago in Paris, and have used it myself. I do not believe it has any advantage over the Goosman apparatus, which is similar and much less expensive. Perhaps the most simple and cheapest method of collecting and applying carbon dioxide snow is the Krenn apparatus, which consists of wooden cylinders varying in size, which can be easily attached to the tank.

MYCOSIS FUNGOIDES. Presented by DR. MALONEY for DR. HOWARD FOX.

S. G., a man, born in Roumania, aged 76, presented an eruption on the face, trunk and extremities which first began to appear five months previously. This eruption, which itched considerably, was of two distinct types: One was made up of patches varying from the size of a silver quarter to that of the palm, which were bright red, and scaly; the other type consisted of small, somewhat ulcerated lesions covered with a brownish crust.

DISCUSSION

DR. ABRAMOWITZ: I saw this patient in the early part of the summer. I was unable to make a definite diagnosis and considered pemphigus, drug eruption, syphilis and mycosis fungoides. The result of a Wassermann test was negative, and the lesions did not improve during two weeks of mixed treatment. He then disappeared from observation. The lesions that he presents now are more numerous than when I saw him last, and, although there are a few that are suggestive of pemphigus, many are configurate, slightly infiltrated, and itch considerably. This, together with the large ulcerated plaque in the left lumbar region, is evidence of granuloma fungoides more than anything else.

DR. CHARGIN: I saw the patient some months ago. I watched several of the lesions develop, especially those on the palms and soles. They resembled the lesions seen in blenorrhagic keratoderma. They were tense, conical papules or vesicles. It is my impression that all the lesions on the body are of the same nature. I do not think we are dealing with mycosis fungoides; the process in the patient is too superficial for that disease.

DR. BECHET: The lesions are distinctly ringed and circular, and are more edematous than infiltrated. There seems to be some evidence of previous bullous formation, and I think that pemphigus should be considered. The man's nationality is also in favor of that diagnosis.

DR. HOPKINS: I have seen the patient a number of times. At first I thought the disease was probably mycosis fungoides. A biopsy was made, and the diagnosis of mycosis fungoides was discarded.

DR. WOLF: I think it is a case of pemphigus. I saw a distinct bulla on the tip of the nose, and the lesions in general give the impression of the foliaceous type of pemphigus. The fact that the lesions show a serous discharge is also in favor of pemphigus.

DR. MALONEY: I am pleased to hear so many reports from the various clinics where this man has been. I think, however, that we will adhere to our diagnosis of mycosis fungoides until we have studied the case further ourselves.

A CASE FOR DIAGNOSIS. LICHENIFICATION. Presented by DR. MALONEY for DR. HOWARD FOX.

W. M., aged 18, a colored laborer, born in the United States, said that one year previously he noticed an eruption on the chest, which later spread to the back, neck and legs. The eruption consisted of discrete, flattened, shiny papules, resembling lichen planus papules, in distinct groups, with normal surrounding skin. A large group extended around the entire neck, spreading down below the clavicles. There were palm-sized patches on the abdomen, cubital and right popliteal spaces and axillae. Some papules were scratched, but the entire eruption did not give the impression of an itchy dermatosis.

Histologic examination of a section of skin showed simple lichenification.

DISCUSSION

DR. HIGHMAN: I saw the patient at the clinic the other day and was able to convince myself that (with the exception of the lesions on the neck and shoulder) he had the papular form of neurodermatitis. The only lesions that seemed to militate against such an opinion were those on the nape of the neck, which looked like lichen planus. The histologic examination, however, did not show anything suggestive of lichen planus. Under the microscope the picture looked like that of a chronic subacute hyperplastic process with a marked parenchymatous and interstitial edema. The configuration of the infiltration in the corium also pointed to a subacute inflammation. The patient seemed to be suffering from that type of skin condition which is called lichenification or, in this country, neurodermatitis.

MULTIPLE EPITHELIOMAS. Presented by DR. THORNLEY.

W. T., a marine engineer, aged 54, married, born in the United States, had for the past fifteen years been troubled with an eruption on the face and trunk, with considerable itching. His uncle and aunt died of tuberculosis. There was no history of cancer in the family. He had six healthy children, and his wife had not had any miscarriages. He gave a history of having had gonorrhea thirty years previously, the discharge coming on fourteen days after the last intercourse. He denied having had any lesions on the penis; a secondary eruption was not noticed. The eruption consisted of erythematous patches followed by scaling. During the past year many of the lesions had ulcerated. There was leukoplakia in the mouth. Involving the right eyebrow, the right side of the nose and the left side of the face were oval ulcerating lesions. The one on the left side of the face showed an atrophic scar in the center. The patient presented similar lesions on the chest. On the back there were scaly, dull red, infiltrated patches of various sizes. Results of two Wassermann tests were negative. A biopsy showed basal cell epithelioma.

A roentgen-ray examination of the chest showed granular mottling of the first interspace on the right side and a dense oval shadow in the region of the third rib and midclavicular line on the left side, about the size of a pigeon's egg, probably due to tuberculosis.

MULTIPLE EPITHELIOMAS. Presented by DR. MALONEY for DR. HOWARD FOX.

G. B., a white man, aged 40, born in the United States, presented on the face multiple circinate lesions ranging from the size of a pea to that of a dime, of three years' duration, most of them being slightly elevated, with thin, pearly borders and atrophic centers; others were indurated, crusted and looked somewhat like warts. There were many scars, indicating the sites of previous lesions. Lesions on the eyelids and contractions from former lesions had produced an ectropion.

Histologic sections taken from some of the lesions showed the presence of basal cell epithelioma.

URTICARIA PIGMENTOSA. Presented by DR. MALONEY for DR. HOWARD FOX.

I. P., a girl, aged 2, born in the United States, had had a generalized eruption since birth. The eruption consisted of brownish pigmentations varying in size from that of a pinhead to that of a pea, with an occasional papule and wheal. Dermographism was also present.

URTICARIA PIGMENTOSA. Presented by DR. E. R. MALONEY for DR. HOWARD FOX.

S. J., a girl, aged 10, born in the United States, presented over the entire body a diffuse eruption of brownish pigmented patches the size of a pea and larger, some covered with fine scales. Here and there were raised papules and wheals, also a distinct dermographism. This condition had existed since the child was 4 months old. Otherwise, she was well.

LARVA MIGRANS. Presented by DR. BECHET.

P. F., a white man, aged 42, from the service of Dr. Aitken, said that he had been living in the country near Miami, Fla, for two years, and had been in New York for two weeks. The eruption was scattered generally over the arms, trunk and legs, and while many of the lesions were badly excoriated there were several serpiginous, elevated, reddened burrows, particularly on the arms. A search had been made for the organism, but it had not been found.

DISCUSSION

DR. HOWARD FOX: Dr. Kirby-Smith, who has had a most extensive experience and has done much original work with larva migrans, recommends freezing with ethyl acetate as the best treatment. He advises the application of cotton or gauze wet with ethyl acetate, applied to the lesions and covered with rubber cloth. From one to five such applications usually accomplish the desired result.

A CASE FOR DIAGNOSIS: ULCERATIONS OF THE MUCOUS MEMBRANE OF THE MOUTH. Presented by DR. CHARGIN.

J. F., a man, aged 38, married, a tailor, had been a patient at Mount Sinai Hospital during August and September, 1926. His chief complaint was pain in the chest, aggravated on swallowing. Results of physical examinations of the chest and abdomen were negative. Results of fluoroscopic and roentgenologic examinations of the esophagus were negative. Obstruction could not be detected on passing sounds. The patient said that he had not had syphilis. Results of the Wassermann test, taken twice, proved negative. Observations of the spinal fluid were negative. Examination of the mouth showed several ulcerations of varying depth and size. These were located mostly on the left side. They had existed for three weeks when the man was admitted, and while he was in the hospital had healed under simple medication. The patient was discharged late in September with the diagnosis of psychoneurosis. About six weeks later, he appeared at the outpatient department with a recurrence of ulcerations in the mouth of several days' duration. An examination showed four well marked deep ulcerations, irregular in outline. They were on the left side of the mouth, one on the cheek, one on the buccal aspect of the upper gum above the molar teeth, one on the left margin of the tongue and one on the upper lip, inner aspect. They were painful when touched, and bled easily. The smallest of the ulcers was half an inch (1.2 cm.) across, and the largest was fully an inch (2.5 cm.) wide. There were two healing lesions on the lower lip, which suggested involuting hypertrophic syphilitic papules. Smears for tubercle bacilli and Vincent's organism gave negative results. Gram-positive bacilli and diplococci were present. The biopsy did not show evidence of tuberculosis or syphilis, and chronic inflammatory tissue was reported. While under observation at the clinic, the lesions were healing under mild antiseptic local applications.

Various probable diagnoses were considered, but for one reason or another all were discarded except malingering. This was favored by the fact that the hospital diagnosis of his general condition on discharge after careful study was psychoneurosis.

DISCUSSION

DR. HIGHMAN: It is an important case and should not be ignored. The man has a curious punched-out lesion on the lower margin of the left side of the mouth. It does not conform to any of the ordinary granulomatous lesions. On account of the peculiar aspect, it is fair to regard this as Dr. Chargin does. The man is enamored of being the center of attraction. I am sure that it is an artificial lesion, and is self-inflicted.

DR. CANNON: The lesions on the mouth and lips do not impress me as being self-inflicted. They are, for the most part, sharply defined and raised ulcerations with little surrounding inflammation. The one on the tongue is deep and irregular, with ragged necrotic edges. I would not hesitate to make a definite diagnosis of syphilis were it not for the negative Wassermann reaction, and I should have the test repeated. If the second test is negative also, I should give a provocative arsphenamine treatment. I saw a similar case four years ago in which the reaction to the Wassermann test became 4 plus after an injection of arsphenamine, and the lesions disappeared.

DR. ELLER: I think the patient is suffering from what is known commonly as canker sores. The history of acute outbreaks of superficial ulcerations which clear up spontaneously without treatment, and the numerous recurrences point to that diagnosis.

DR. ANDREWS: I suggest the possibility of recurrent necrotic stomatitis reported by Sutton.

DR. CHARGIN: I feel that syphilis can be definitely ruled out. Aside from the fact that a syphilitic history was not obtainable, and the biopsy did not show syphilis, the reaction to the Wassermann test has proved negative on two occasions, and the cerebrospinal fluid is entirely normal. Moreover, the healing lesions on the lower lip somewhat resemble disappearing hypertrophied secondary papules and fit in with syphilis of the first or second year after the infection, while those on the tongue and cheek are deeply ulcerated, a type which — if syphilitic — belongs in the tertiary period. The association of an early lesion and late tertiary lesion is not usual, and militates against syphilis as the probable diagnosis. To rule out syphilis by the therapeutic test, I will administer some treatment and observe the effect. As regards drugs, adequate inquiry was made, and I believe that drug eruption may be definitely ruled out. In aphtheous stomatitis, the lesions are much smaller and do not show the large and deep ulcerations presented in this case. Tuberculosis was, of course, considered, but the biopsy gave entirely negative results from that standpoint.

ANGIOKERATOMA MIBELLI. Presented by DR. CHARGIN.

L. B., a white man, aged 20, a soda dispenser, said that he had first noticed lesions about ten years previously, and that they were gradually becoming somewhat more distinct and larger. His general condition was good, but he said that he suffered from frostbite during cold weather. The lesions were present on the dorsal and plantar aspect of both feet and on the ulnar margin of both hands. The condition was most marked on the toes, affecting all of them, the lesions being isolated and in groups and varying in size from that of a pinhead to that of a millet seed. The inner margin of the left foot showed

the greatest number of lesions. The lesions looked like localized dilatations of the vessels, were livid and grayish red, and many of them were hyperkeratotic. The hands, but more especially the feet, were congested and gave the impression of many dilated vessels under the skin. On pressure, the tissues became pale, but the congestion rapidly recurred on removal of pressure. The ears, elbows, and knees were not affected. Subjective symptoms were lacking.

DISCUSSION

DR. POLLITZER: I was especially pleased to see this case. I was working in Unna's Clinic in Hamburg in 1889 when Mibelli brought there specimens and sections of the first case of this disease recorded. The case shown here is a good example of this rare disease.

NEURODERMATITIS RESEMBLING LICHEN PLANUS. Presented by DR. MAX SCHEER.

Mrs. J. A., aged 30, a housewife, born in Italy, came to the Mount Sinai Clinic on Oct. 8, 1926, for treatment of an eruption which had been present for ten years. Over the entire interscapular region and extending laterally over the scapulae and down the back to the lower dorsal region, was an eruption which faded gradually into the normal skin. It consisted of flat, shiny, irregular or polygonal grayish papules, from the size of a pinhead to one-eighth inch (0.3 cm.) in diameter. The papules were closely set giving the eruption the appearance of a mosaic. The color of the entire patch was a grayish red. Many of the individual papules were indistinguishable from lichen planus. There were similar but smaller patches on the lower part of the abdomen and in the lumbar region. Elsewhere, on the trunk and arms were many excoriations and marks of scratching in areas where lesions were not present. Lesions were not present in the mouth. The eruption itched, especially at night. In spite of the lichen-like appearance of individual papules, the general appearance was that of neurodermatitis rather than lichen planus.

Pathologic Report (Dr. Highman).—The specimen is that of a chronic inflammatory process. This might be psoriasis or primary or secondary lichenification. The histology of the scale and the absence of Munro's abscesses throw the evidence against psoriasis and in favor of lichenification. There is nothing about the infiltration that suggests mycosis fungoides. Lichen planus, Darier's disease and other chronic inflammations more specific in aspect can be definitely excluded. To my mind, if a microscopic diagnosis can be made under these conditions, it should be lichenification.

ACNITIS (?). Presented by DR. TRAUB.

M. M., aged 34, a clerk, born in the United States, first presented himself in the service of Dr. Williams at the Skin and Cancer Hospital on Oct. 4, 1926. He exhibited an eruption on the face which had first appeared two months previously. It consisted of papular lesions of varied sizes of a reddish to dark violaceous color, some of which were pustular. The older lesions were crusted and showed necrotic centers. The eruption was bilateral, across the bridge of the nose and cheeks. The papulopustules healed, leaving scars. The reaction to the Wassermann test on the day he was first seen was 1 plus. A boric acid ointment was used locally, and he was given mixed treatment. In the course of three weeks the condition improved. Reaction to another Wassermann test, taken on October 27, was reported as being 2 plus. On this date

several nodular lesions were discovered on his trunk, which he stated had been present for only a week. These lesions closely resembled hypodermic sarcoids.

Within the past year, the patient had had a small tumor removed from the rectum, the histologic structure of which showed papilloma, according to the pathologist of the New York Hospital.

The tuberculin test gave an erythema of 2 inches (5 cm.) around the site of the 1:1,000 dilution, and an erythema of 1 inch (2.5 cm.) in diameter about the site of the 1:10,000 dilution injection. Neither of these showed any infiltration, and were reported as negative by the laboratory. The control did not show erythema or infiltration.

The diagnosis lay between acnitis, lupus miliaris disseminatus faciei and an atypical form of tertiary syphilis.

A Case for Diagnosis. Extensive Pigmentation. Presented by Dr. Maloney for Dr. Howard Fox.

R. L., a colored woman, aged 53, born in the United States, said that four years previously she first noticed spots of deep pigmentation on the face, which spread over the entire body. She presented deeply pigmented patches the size of a pinhead and larger which had coalesced in some areas. She gave a history of attacks of sore throat for which she had been treated for several years previous to the pigmentation. She also gave a history of syphilis five years previously, for which she had not received treatment until a year prior to presentation, when she received five injections of arsphenamine. The Wassermann reaction was negative.

DISCUSSION

Dr. Wolf: I think the pigmentation is probably due to arsenic.

Dr. Thornley: I am inclined to think that this may be a case of argyria.

Dr. Chargin: It is perhaps not easy to detect the color of argyria in the skin of the negro, but it should be bluish or slate colored. The pigmentation in this case resembles that observed following lichen planus, arsenotherapy and Addison's disease.

Dr. Howard Fox: This case should be designated as an extensive melanosis of unknown origin. I do not think that either argyria or arsenical pigmentation can be considered. It would be hard to conceive of argyria appearing in a patchy manner, as seen on this patient's chest. Arsenical pigmentation would be likely to occur on the covered parts and as a reticulated eruption. In a long experience with negroes, I do not recall having seen one of this race suffering from argyria.

Dr. Eller: I have seen a similar eruption in a colored woman, aged 40, who had been taking a proprietary medicine, the nature of which was unknown.

Dr. Parounagian: I do not have a diagnosis to offer, but I do not agree with the diagnosis of argyria. That would be one uniform color all over the body, except that the exposed parts would be darker.

Pigmentary and Annular Lichen Planus Limited to the Face. Presented by Dr. Abramowitz.

S. N., aged 18, born in the United States, a student and the son of a physician, gave a negative past history. He said that about a year previously, following an insect bite, a light brown pigmentary patch developed on the left

side of his forehead, about the size of a twenty-five cent piece. He did practically nothing for this until about six months later when he first came under observation; a mild application of trichloracetic acid was then made. At the time of this application there was nothing definite about the patch, except that it was light brown, rather limited and looked like chloasma more than any other condition. He was not seen again until one month before presentation, when he said that about three weeks after the application of the acid several new patches had appeared on the rest of the forehead. An examination of the body again showed one or two possible lichen papules on the backs of the wrist and on the glans penis. Lesions were not present in the mouth at any time. When presented, he exhibited on the forehead, isolated and grouped circular lesions varying in size from 1 to 2 cm., the edges slightly raised and depigmented but hardly infiltrated, the center of the lesions being brown. A few scaly lesions were present at the hair line, with some erythematous lesions on the bridge of the nose. Owing to the absence of any definite lichen planus lesions on the other parts of the body, various other diagnoses were considered at first, but observation for the past month showed that the lesions were probably those of a pigmentary annular lichen planus in a singular location — limited to the face. The result of the Wassermann test was negative.

ANEURYSM OF THE RIGHT AXILLARY ARTERY. Presented by DR. PAROUNAGIAN and DR. MASON.

J. J., aged 44, from the Third Surgical Division of Bellevue Hospital, gave a history of chancre fourteen years before presentation. Secondary lesions did not appear, and the patient was not treated. When presented, he complained of stiffness in the right arm and hand and swelling around the right axilla. There was also a "prickly" sensation in the right hand. The duration of these symptoms was three months. Reactions to two Wassermann tests were reported 4 plus. There was a large tumor in front of the right axilla, which was firm, and pulsation was readily felt. The man was under antisyphilitic treatment with arsphenamine and mercury in small doses.

DISCUSSION

DR. THORNLEY: The case is of great interest to me, for we had an almost identical one which proved to be an aneurysm of the right brachial artery. The interesting point was that at the operation the cause of the aneurysm seemed to be an exostosis growing from the area adjacent to the lesser tuberosity of the humerus.

FOX-FORDYCE DISEASE. Presented by DR. ROSTENBERG.

A woman, aged 29, born in Russia, was nervous, and asserted that the trouble with her skin dated from her last confinement. She had been married for six years, and this confinement had occurred three years previously, at which time she had been badly lacerated, developing a prolapsus uteri. Apparently there was not any thyroid involvement or other physical disturbance. The lesions were located in both axillae and on the pubic region, and there were also a few papules on both breasts. They were arranged in parallel rows, and were the size of millet seeds; they were conical, and some were pierced by a hair. The color was that of the normal skin. Itching was pronounced, especially on change of temperature and during menstruation.

A Case for Diagnosis. Pityriasis Rosea? Presented by Dr. Traub.

Mrs. E. W., aged 29, gave a history of having had an eruption on the body a little more than a year previously, which was diagnosed as secondary syphilis, and the reaction to the Wassermann test had been reported 4 plus. All the lesions had disappeared under antisyphilitic treatment.

Five months prior to presentation, an eruption appeared on the body that was first diagnosed as pityriasis rosea. Under treatment with calamine lotion and ultraviolet radiation, the lesions seemed to be disappearing, but before all had disappeared new ones appeared of a different kind, which suggested an annular lichen planus or possibly an annular syphilid. Although actual vesicles were not seen, the eruption, before it became lichenoid, gave the suggestion that fluid was present. On the least scratching, there was a decided amount of oozing such as one might expect in a vesicular eczema. The eruption was pruritic. The reaction to the Wassermann test at this time was negative. Owing to a kidney complication, mercuric salicylarsenate was used with some improvement, though apparently the improvement was not so marked as that following neoarsphenamine. Roentgen-ray treatment in fractional doses relieved the itching, and seemed to benefit the lesions.

Hydroa Vacciniforme. Presented by Dr. Howard Fox.

C. L., aged 10, born in the United States, seen at the University and Bellevue Clinic on July 30, 1926. Had suffered from recurring attacks of an eruption for the past four summers and also during the past winter. Although most of the attacks occurred during warm weather, there was not a definite history of their relationship to sunlight. At each outbreak the lesions invariably appeared first on the ears (especially the helix) and about a week later on the face and hands. The eruption always began as vesicles, some of which became purulent, ruptured spontaneously, and formed crusts which fell off in two or three weeks, followed by scars.

When the patient was presented, the eruption was located on the ears, nose, cheeks, forehead, extensor surfaces of the arms, forearms, backs of the hands, back of the neck, lumbar and sacral regions. It was symmetrical and consisted of discrete and coalesced lesions, some of which were flaccid vesicles and bullae, varying in size from that of a pea to that of a finger-nail; others had formed yellowish or blackish crusts. Interspersed with these active lesions were numerous small pitted scars. The eruption on the hands was especially profuse, occasioned a feeling of soreness and was accompanied by moderate swelling. The patient did not complain of itching, and the lesions did not show objective evidence of scratching. There was a slight enlargement of the cervical glands.

The patient was a well nourished boy of blond type, apparently in good general health and of normal mentality. He had suffered during infancy from measles, chickenpox and "abscesses of the ears." There were five brothers and two sisters, none of whom had suffered from a similar disease of the skin. His mother had died in childbirth, his father was living and well.

A specimen of urine was submitted to Dr. Alexander O. Gettler of Bellevue Hospital to determine the possible presence of hematoporphyrin. He wrote as follows: "I have chemically and spectroscopically examined the sample of urine which you submitted to me. I can find no trace of hematoporphyrin therein. The tests for this substance, however, that are available are not very sensitive, and therefore it may be possible that a very small amount may be

present. All that I can positively state is that the urine does not contain hematoporphyrin in sufficient amount to be detected by the methods at hand."

SCLERODERMA. Presented by DR. RULISON.

Miss G. L., aged 38, had always been well until four years prior to presentation. At that time she noticed a white, painless, hard lesion the size of a pea on the left side of her lower lip, midway between the chin and the vermilion border. She at first thought this was an insect bite. The lesion persisted and slowly increased in diameter. When she first came under observation, two years ago, it was the size of a quarter, and had many fine telangiectatic vessels showing through the waxy white background. The possibility of this case being the morpheiform type of basal cell epithelioma was suggested by Dr. Highman, but after studying the lesion, he considered it a case of scleroderma. The telangiectasia noted two years before had largely faded, but in the newer parts of the lesion similar vessels were seen. There was a tiny, indolent scaling exulceration in the center of the patch, which had been present for a considerable time.

DISCUSSION

DR. POLLITZER: In my opinion this is a case of circumscribed scleroderma. A rather unusual feature is the telangiectasis scattered through the lesion, whereas telangiectases are usually found only at the periphery. Of course, this is a vascular region in which the plaque is located, and interference with the capillary circulation by the connective tissue sclerosis may account for the unusual picture.

A CASE FOR DIAGNOSIS. PITYRIASIS ROSEA? Presented by DR. GOODMAN.

D. P., a girl, aged 7, developed an eruption on the abdomen and back eight weeks prior to presentation. When first observed, six or eight circinate pinkish areas were present. The treatment had consisted of ointments, tincture of iodine and a medicated sulphur soap. Pruritus had been a troublesome symptom. She had taken Castola as a laxative, usually once a week.

Examination showed that the eruption extended over the trunk, from the level of the nipples to and including the loins, being most marked on the ventral surface. There were irregular patches, from pinhead to coin size, raised above the level of the skin and with evident borders. There was slight scaling. The skin between the lesions was darker than normal skin for the most part, although there were patches of skin lighter than either the normal or diseased skin, with fine telangiectases. The last were probably due to the application of iodine six weeks previously. The result of an examination for tinea was negative.

The differential diagnosis was: (1) pityriasis rosea, (2) tinea circinata, (3) dermatitis venenata (sulphur eruption) and (4) phenolphthalein eruption.

DISCUSSION

DR. TRAUB: I think the condition is pityriasis rosea.

SUPERINFECTION WITH SYPHILIS. Presented by DR. PAROUNAGIAN and DR. MASON.

T. M., aged 42, had contracted syphilis seven years previously, having had a chancre at the sulcus. He had received three arsphenamine treatments and

some mercury at St. Peter's Hospital, Brooklyn, N. Y., and was referred to the Bellevue Syphilis Clinic on Oct. 26, 1926, for treatment.

Although the patient gave a history of infection seven years previously, examination showed mucous patches on both tonsils, common to the secondary stage. Genital chancre was not found, but further search revealed a recent scar on the left forearm, which the patient said was caused by a dog-bite received in July. This led to the diagnosis.

ARSPHENAMINE DERMATITIS. Presented by DR. PAROUNAGIAN and DR. MASON.

Mrs. A. I., aged 40, an Austrian, was admitted to the Bellevue Syphilis clinic on Sept. 1, 1926. She then presented a generalized maculopapular eruption. The reaction to the Wassermann test was 4 plus on two occasions, and treatment was instituted. After the fifth neoarsphenamine treatment, she developed a generalized dermatitis about October 15. She also received five injections of mercury simultaneously.

LEUKOPLAKIA LINGUALIS. Presented by DR. PAROUNAGIAN and DR. MASON.

A. S., a Russian, aged 55, said that he had not had syphilis. His wife had had one miscarriage and seven living children. He did not present a scar or other manifestation of syphilis. The reaction to the Wassermann test was 3 plus on Aug. 3, 1926. The condition was extensive on the dorsum of the tongue, and slight on the buccal mucosae.

MORPHEA AND LATENT SYPHILIS. Presented by DR. MALONEY for DR. HOWARD FOX.

O. W., a Swedish woman, aged 53, presented lesions on the right arm and right thigh, made up of ivory white, thick, shiny patches with purplish borders, the size of a silver dollar. These patches began four months previously as small spots, which gradually increased. She gave a history of syphilis which began sixteen years before presentation. Ten years before she had had two miscarriages. A Wassermann test taken at this time gave a positive reaction, and she received several intravenous injections of arsphenamine.

A Wassermann test taken a month ago gave a 4 plus reaction.

EPITHELIOMA RESEMBLING GRANULOMA INGUINALE. Presented by DR. MALONEY for DR. HOWARD FOX.

A. G., a white woman, aged 55, born in the United States, said that ten months previously she noticed a lump about the size of an egg under the skin of the left inguinal region. The skin covering this was red but not tender to the touch. Three months later this mass broke down, resulting in a punched-out, oval shaped ulceration measuring about 3 by 1 inches (7.6 by 2.5 cm.), with an irregularly shaped, hard, pearly, rolled border.

A Wassermann test of the blood gave a negative reaction, and an examination of smears from the lesion failed to show the presence of Donovan bodies. Histologic examination of a section of tissue proved the growth to be basal cell epithelioma.

EXTENSIVE SCARRING FOLLOWING SYPHILIS. Presented by DR. MALONEY for DR. HOWARD FOX.

H. V., a laborer, aged 65, born in the United States, had a chancre in 1887, for which he received only local treatment. In 1902 an eruption appeared on

the back, involving almost two thirds of both sides, the right shoulder, chest and right upper arm. This eruption was finally cleared up in 1905, at the City Hospital, after having lasted for three years. It disappeared in three weeks under mercurial inunctions, leaving a network of thickened scar tissue with keloidal tendency in places. The Wassermann test, October, 1926, gave a plus-minus reaction.

TERTIARY SYPHILIS (SEVERE). Presented by DR. MALONEY for DR. HOWARD FOX.

F. G., a colored housewife, aged 39, born in the United States, said that three years previously she noticed an ulcer on the nose and later similar lesions on the face and lip. These lesions healed within a few months without treatment, but were followed by others. Finally there was a complete destruction of the anterior half of the nose, marked distortion of the lip and extensive disfiguration. She received eight neoarsphenamine treatments, and two injections of mercuric salicylate, which cleared up all the active lesions. The Wassermann reaction was 4 plus.

CHANCRE OF THE TONGUE. Presented by DR. MALONEY for DR. HOWARD FOX.

W. K., a porter, aged 35, born in the United States, noticed a pea-sized white ulcer on the center of the tongue about three weeks prior to presentation. Two weeks later a rash appeared, covering the face and trunk. This eruption was maculopapular. There were mucous patches on the tonsils and a general adenopathy. The ulcer on the tongue was the size of a dime, with a white unhealthy base and a markedly indurated border. There was no evidence of chancre elsewhere. Dark-field examination gave negative results. The reaction to the Wassermann test has not yet been reported.

PARAFFINOMA. Presented by DR. CANNON.

E. K., a woman, aged 57, had had paraffin injected subcutaneously on the bridge of the nose two years previously. She presented a tender, erythematous, firm, circumscribed tumor on the bridge of the nose.

MORPHEA. Presented by DR. CANNON.

S. H., an unmarried Irish woman, presented a sharply defined patch about 3 cm. in diameter, ivory colored and surrounded by normal skin. It was located below the left eye and had been present for three years.

GEORGE C. ANDREWS, M.D., Secretary.

ATLANTIC DERMATOLOGICAL CONFERENCE: NEW YORK, NEW ENGLAND, PHILADELPHIA, AND BALTIMORE-WASHINGTON DERMATOLOGICAL SOCIETIES

Joint Meeting, Boston, Mass., Nov. 5, 1926

C. MORTON SMITH, M.D., *Presiding*

LYMPHANGIOMA CIRCUMSCRIPTUM. Presented by DR. BOARDMAN.

A white girl, aged 8, born in America, had had hard, colorless, deep-seated vesicles, one-sixteenth to one-eighth inch (0.15 to 0.31 cm.) in diameter, for

four or five years, on the left side of the chest. These vesicles were slightly brownish, of normal skin color. There were also a few warty, brown, soft tumors. A biopsy led to a diagnosis of lymphangiectasis. The lesions had been treated with carbon dioxide snow, and were disappearing under treatment.

DISCUSSION

DR. FRASER, New York: I believe that lymphangioma circumscriptum is not the proper term for this condition, in the sense that there is here a new growth, and that the condition should be described as lymphangiectasis.

HYDROA AESTIVALE. Presented by DR. BOARDMAN.

A white American school girl, aged 9, for the past six years had had lesions which began as hemorrhagic blebs one-eighth to one-quarter inch (0.31 to 0.63 cm.) in diameter, and which dried up, leaving bloody crusts. They always left depressed scars. The lesions appeared only after exposure to sun and wind. They were located on the face and extensor surfaces of the forearms and legs. There was a slight itching and soreness when the lesions were active.

DISCUSSION

DR. WHITE, Boston: I suggest the use of the Alpine lamp on this patient. I have recently treated two patients who could not go into the sunlight without getting blisters. I began with a small dose, increasing gradually, without any reaction. Many of these cases are arrested by the use of the ultraviolet ray; some by sunlight and not by the ultraviolet ray.

DR. EICHENLAUB, Washington: I questioned the patient closely about the color of the urine, as I have had cases in which the urine was a reddish brown at the time of the attack, and I felt that might be a factor. The child's mother said the color had not changed since the attack began.

DR. WEIDMAN, Philadelphia: I saw a case of hydroa aestivale several years ago and tried to reproduce the disease between the attacks. The patient had large bullous lesions all over the neck and face, and the attacks came on particularly in the spring and fall. I saw the patient two or three times when the eruption had faded and practically disappeared, and I could not reproduce the attacks by ultraviolet light, by sunlight or by sunlight and wind. When the skin was treated with light, the patient's reaction was practically the same as the reaction that I had. Some of these cases seem to have an immune phase in which they are not susceptible to light.

DERMATITIS HERPETIFORMIS OR DERMATITIS FACTITIA. Presented by DR. GARFIELD.

A white woman, aged 34, married, an American housewife, had had ever since she could remember, surely since she was 4 years old, lesions which began as blebs or vesicles which have rarely been seen at the clinic. The usual lesions were ulcerations, some superficial, some deep, irregular, sometimes grouped and sometimes scattered. On healing they left depressed, irregular scars. These lesions itched severely. They were on the front and back of the chest, the sacral region and the buttocks. A biopsy showed chronic inflammation. There was also an increase in the eosinophils. The Wassermann reactions have been positive since 1922, in spite of considerable antisyphilitic treatment.

DISCUSSION

DR. WRIGHT, Philadelphia: I think it is dermatitis factitia in spite of the scars over the scapulae. I note that the lesions are regular and look exactly like burns, as though the patient had applied some acid.

DR. BOARDMAN, Boston: It is interesting to note that when she was asked if she could reach the lesions over the scapulae, her arm went up there immediately, and she could reach any of them quickly.

DR. DOWNING, Boston: I think it is a case of dermatitis factitia. Since the patient was asked if she would come to this clinic, the lesions have increased markedly.

DR. GARFIELD, Boston: I have asked her several times in the past week if she had any new lesions, and she has told me that she had none, and today when I saw her I asked her the same question, and her answer was, "I have no new lesions at all." I have been following this case with that point in mind. She also says that she has had this condition ever since she was 4 years old, or at least as long as she can remember, and the fact that the lesions are so grouped, localized and symmetrical is in favor of dermatitis herpetiformis.

DR. FOX, New York: If you mean by factitious dermatitis that this girl produced these eruptions purposely, I would rather doubt the diagnosis, particularly on account of the symmetry. Practically all factitia are more or less nonsymmetrical, and it seems as if the presence of this, associated with fresh, excoriated lesions, would put this in the class of neurotic excoriations.

DR. HIGHMAN, New York: There is no sign of infection under or around the lesions. The history of its existing at the age of 4 was obtained only from the patient, and I doubt her word; and if it is said that there are old lesions and that there are no fresh lesions, again I doubt it. Those are perfectly fresh scratch marks.

DR. SWARTZ, Boston: I think the picture of the blood would help to determine the diagnosis in this case, that is, determine whether there is an eosinophilia.

DR. GARFIELD: The blood picture does show an eosinophilia, but Dr. Mallory said at the time it was made that this simply accounted for the chronicity of the lesions, and not the fact that the condition is dermatitis herpetiformis or some other type of eruption. This patient has been coming to the clinic for a long time, being treated for syphilis. She never mentioned these lesions, unless questioned about them, so if she makes them it is not to create sympathy, on our part at least.

DR. HIGHMAN: One of the greatest mistakes is in assuming that if the patient mutilates herself, whether intentionally or not, it is to create sympathy. Patients may do it just to amuse themselves at the expense of the examining physician. I think that when a person has fresh scratch marks, she has scratched, and it is pretty safe to assume that this woman, whatever her motive, has inflicted those lesions on herself.

DR. DOWNING: This patient's answers cannot be depended on. She admitted to me today that she had several new ones.

DR. HAZEN, Washington: In answer to my questions she said that there was absolutely nothing on her body until the itching came on, and she began to scratch.

DR. HIGHMAN: If that is true, her memory must go back to when she was 4 years old, and that seems impossible.

SYPHILITIC ULCERS OF THE LEG AND PAGET'S DISEASE. Presented by DR. APPEL.

A white man, aged 65, for the past six months had had multiple, punched-out ulcers on the anterior surface of the left leg, with dark red bases and circinate borders. There was definite enlargement in the bones of the skull, kyphosis, bowing of the clavicles, left forearm and tibiae. The patient gave a history of having had a primary sore forty years before. A biopsy was not made. The patient had been under antisyphilitic treatment for ten days, apparently without change in the condition.

DERMATITIS HERPETIFORMIS. Presented by DR. DOWNING.

A white woman, aged 43, married, an American housewife, for the last three years had had grouped vesicles or blebs chiefly on the elbows, knees and buttocks and occasionally on the wrists and breasts, nearly always on the extensor surfaces and generally symmetrical. There was severe itching locally, with the appearance of the lesions. They left brown stains for a few weeks, but did not leave scars. Temporary relief from symptoms followed tonsillectomy. For treatment she had had liquor potassii arsenitis (Fowler's solution) at intervals for a year, and the quartz lamp had been applied intermittently.

DISCUSSION

DR. BOARDMAN: The interesting thing is that this condition resembles psoriasis so much in its description. I have not been able to think of any other diagnosis, but with those typical grouped vesicles one cannot think of psoriasis.

A CASE FOR DIAGNOSIS. Presented by MASSACHUSETTS GENERAL HOSPITAL.

A white man, aged 19, a student, said that from a very early age, his hair had been of a light silver "dead" color, the nails brittle, and without luster, while his sebaceous glands had been overactive. After his fourth year, the sebaceous cysts had become infected, swollen and tender. Eight years before presentation acne on the face and neck had given much trouble, followed, in the next few years, by non-tender, erythematous swellings containing pus. These usually appeared in irritated areas, came to a head and disappeared with little discomfort. About four years before presentation, the patient had noticed an erythematous rash on his abdomen after swimming, which disappeared in a week with medication. At the same time the infection started from an infected sebaceous cyst in the lobe of one ear, gradually progressing until it involved the scalp and various parts of the body. The position and extent of the lesions on the body had varied since onset, but the scalp picture changed but little. Microscopic studies (Dr. Hoffman) showed a large micrococcus in exposed blood serum (causal relation?) and a fungus of the higher order — a metaphyte — which could not be identified or isolated. It was not *Penicillium*, *Aspergillus* or *Sporotrichum*. It was like the so-called blastomycetes. For previous treatment the patient had had iodine, Lugol's solution and iodide of potash, which had cleared up the lesion on the body at one time. He also had had surgical treatment of the lesions and treatment by autogenous and stock vaccines, Alpine and Kromayer lamps, germicidal applications, colloidal manganese (intramuscularly). A roentgenogram of the chest was negative. An antero-posterior view of the skull showed a peculiar mottled appearance on the left side of the skull (caused by ointment?). The metabolism rate was —6. A biopsy showed chronic inflammation, and a culture showed *Staphylococcus aureus*. The Wassermann reaction was negative.

DISCUSSION

DR. FOX: I had occasion to treat this young man in New York for a number of months a year or so ago. At that time the condition looked like a severe case of acne, or possibly of tubercles, classed as acne induratum. I tried all kinds of methods; gave a good deal of roentgen-ray and ultraviolet treatment, and advised him to get out in the country and do everything to improve his general condition, but I failed utterly. Many of the lesions were actually curretted and would heal. It never occurred to me that it might be an infection due to yeast. I understand that there have been some conflicting observations, and I should like to hear about these observations, especially as to the possibility of blastomycosis.

DR. TOWLE, Boston: The first thing that impressed me was the extremely poor condition of the boy. I have seen staphylococcus infections refuse to heal in patients of depraved vitality; and this boy is decidedly of that type. We must figure largely on his inability to fight the disease. Whatever the cause, whether a yeast, a coccus, or even acne run wild, improvement of his poor condition must be the basis of successful treatment.

DR. SWARTZ: Some of the Chicago physicians reported that they found organisms similar to blastomycetes and when we first examined the pus we found a cell which at first confirmed the observation, but it was later disproved. We made a culture of the pus, and that repeatedly showed only a growth of staphylococcus and no fungus. We tried various methods, and all we found was the staphylococcus.

DR. CUMMINS, Boston: I should like to have the opinion of those present as to whether or not it would be safe to do anything radical in the way of surgery. The case is to be shown next week to the Surgical Service. We have had consultations to determine whether they would open some of the lesions, and there is conflict of opinion. One surgeon said he would be willing to open some of the lesions; then another member of the Surgical Service refused to operate, and now we are at a standstill. I am wondering whether there would be any objection to curretting some of those lesions and securing freer drainage.

DR. HIGHMAN: We have recently had a case under observation with some similarity to the one under discussion. I think it would not be difficult to establish the presence of the tubercle bacillus or the blastomycosis organism if they were present. The presence of only staphylococci is significant. The most important factor is not the parasite, but the boy's poor resistance to any organism, whether the eruption is acne, the result of trauma, or whatever it is. We do not know how to build up the etiology of the case, but the important thing is to find some practical means of relieving the patient. In this connection I have had under observation a girl of about 15 who has been ill about a year with lesions of this type which do not clear up. We have found that ordinary surgical treatment of the lesions (by which I do not mean operative surgery, but treatment of the lesions as you would any nonsurgical blister) has afforded the best results, and there is a great deal of improvement. In addition, she is being well fed; of course, there is no question but that this boy has been well nourished.

DR. WHITE: I recall the case of a chauffeur whom I saw soon after the war, one of the well known coaches of the Yale football team. The man was exhausted and in poor condition, and this process occurred only in his scalp; one could hardly put a finger on any normal part of the scalp; the hair was

all gone. He was given vaccines, and today he presents a scalp in good condition, and the hair is coming back over a wide area. I believe that should be tried here.

DR. KETRON, Baltimore: I suggest that a more careful bacteriologic examination be made in this case. To me it looks like a fungus infection. In numerous cases the pus that flows easily and is easy to obtain does not contain the parasites. It is only in the blastomycetes that one is able to find the parasites in the pus. I would suggest getting under the edges of some of these lesions under local anesthesia and examining the pus found there thoroughly before we rule out the possibility of its being a fungus infection.

DR. SWARTZ: That has been done, and we have not found anything.

DR. LANE, Boston: I think we will have to grant that this young man has a low resistance to some organism. We found the staphylococcus time and again, so it does enter into the picture, but it seems to me that there is something else of an infectious nature which enters into it. The story which he gives concerning the clearing up of the lesions almost immediately coincident with the use of potassium iodide in fairly large doses would seem to add evidence to the ground for this feeling. It is easy to suppose that this fungus, or whatever it is, has acquired some resistance or immunity to potassium iodide, so that I believe still further search should be made for something in addition to the general problem of raising his resistance. In regard to surgical intervention in his case, it seems hardly possible that all the lesions could be curetted and drained, or even painted with iodine without a long period of treatment; on the other hand, is it possible to take small areas at one time and give thorough treatment? I question the feasibility of surgical treatment.

PEMPHIGUS. Presented by DR. DOWNING.

A white woman, aged 60, an Irish housewife, for three months had had lesions in the mouth which started as blisters and soon broke, leaving eroded areas on the back part of the palate. There are ruptured vesicles still present on the mucous membrane on the left side of the lip. The tongue is heavily coated, especially in the middle third, brown with exaggeration of papillae, posteriorly, suggesting small hairs. She has been treated with mercurochrome-220, 5 per cent solution, and potassium chlorate. Her condition had not changed in the one week she had been under observation.

DISCUSSION

DR. WRIGHT: I should like to ask whether an examination was made for Vincent's organisms.

DR. BOARDMAN: It was not.

DR. WEIDMAN: I think there is too much infiltration for pemphigus, and I would sustain the diagnosis for Vincent's organisms.

DERMATITIS VENANATA (EXFOLIATIVA); PEMPHIGUS EXFOLIATIVA, ACUTE FORM; DERMATITIS HERPETIFORMIS. Presented by MASSACHUSETTS GENERAL HOSPITAL.

A white man, aged 32, had been in good health up to one year before he was presented, at which time he chafed his right thigh against a lathe. A lesion appeared which he thought was a boil, and he treated it with salve from the shop infirmary. The local lesion did not heal. General vesiculation occurred a

week later. One month later there was still good skin with many blisters. He was treated with sulphur ointment (which burned) and with cold cream. From that time until May, 1926 (six months before presentation), when he entered the Massachusetts General Hospital, many kinds of medication were tried, both external and internal — in the hands of several physicians. Before entry, the glands in both axillae and in the right groin became swollen and broke, exuding foul pus. On entry the entire surface of the body (except palms, soles, fingers and toes) showed continuous areas of raw, red, oozing skin or whitish, moist exfoliation. Slight rubbing would free any remaining skin. A few primary lesions in the form of pea-sized, superficial vesicles appeared on the fingers. The body gave off a sickening, sweet offensive odor. Since entering the hospital the patient has had many forms of prescriptions. Of these, starch powder baths and crude coal tar ointment seem to have been the most effective, but in spite of all medications, vesicles continued to appear, and the skin breaks down at intervals.

ECTHYMA. Presented by MASSACHUSETTS GENERAL HOSPITAL.

A white boy, aged 12, was first seen at Massachusetts General Hospital seven months before presentation when he showed on the trunk and extremities, scars intermingled with depressed crusts and purulent lesions. He was referred to the ward with a diagnosis of ecthyma. He had had a series of quartz light therapy and potassium iodide. The condition cleared up one and one-half months before presentation. Locally he was using a mixture of salicylic acid and sulphur precipitate in the form of ointment. The condition never cleared up completely, but recently grew worse and the patient had to be readmitted to the ward. The result of the blood test was negative except for variations in red blood corpuscles — from 6,000,000 to 7,000,000 to 4,000,000. A roentgenogram of the chest was negative. A Wassermann reaction also was negative. A biopsy showed wandering cells and focal abscesses.

DISCUSSION

DR. LANE: I happened to see this patient when he first came into the ward, and he had on one wrist a small bulla of which we were able to watch the progress, and that developed to perhaps about 1 cm. in length and 0.5 cm. in width. It brought to my mind the question of an epidermolysis bullosa — the scars and long history and the habit he has of leaning on his elbows brought that diagnosis to mind.

CHRONIC CELLULITIS. Presented by MASSACHUSETTS GENERAL HOSPITAL.

A white man, aged 40, married, had had lesions at varying intervals for the past two and one-half years. The present attack had existed for six months. The patient presented an erythematous and apparently fluctuating lesion on the forehead extending down over the face. A roentgenogram of teeth was negative, and a roentgenogram of the sinuses showed a thick membrane of the left antrum. Results of a general physical examination were negative.

DISCUSSION

DR. TOWLE: I think this is a case of cellulitis with involvement of the antrum. If you clear up the infection in the antrum, the infection of the skin will clear up.

DR. SWARTZ: The laryngologists did not say whether the infection of the antrum had anything to do with the large involvement of the tissues of the face. They were positive that the antrum was cleared up.

SCLERODERMA DUE TO CENTRAL NERVOUS SYSTEM LESION FROM CONGENITAL SYPHILIS. Presented by DR. APPEL.

A white boy, aged 6, an American, following an attack of pneumonia, had had a thickening of the skin for the past eighteen months. It was adherent to the underlying tissues. There was a slight atrophy of underlying muscles in the right buttock and leg. The skin was pearly white, glistening and hard. The patient showed a dome-shaped forehead and a high-arched palate. There was delayed dentition; the secondary incisors had not appeared. There was also a saddle-back nose. The course of the disease had been gradual, and there was slight pain at times. He had had one course of arsphenamine, consisting of ten injections, and potassium iodide. There was considerable improvement in the local process and general condition. A blood test was moderately positive, and a test of the spinal fluid was also positive.

CONGENITAL SYPHILIS WITH RECONSTRUCTION OF NOSE. Presented by DR. BOARDMAN.

A white American woman, aged 26, had had a boil on the inner canthus following an insect bite fourteen years before presentation. It broke; the tear duct was blocked, and necrosis of the bones of the nose occurred. The entire nose sloughed off and healed with clean scars nine years later. The patient took some antisyphilitic treatment at that time. In 1922, after considerable antisyphilitic treatment, she was operated on for reconstruction of the nose. She neglected treatment, and the reconstruction work broke down. Following further antisyphilitic treatment, another reconstruction operation was performed. The reconstruction work has not yet been completed.

PSORIASIS (?). Presented by DR. DOWNING.

A white boy, aged 2, an American, for a month had had scaling, circinate, yellowish-pink patches on the abdomen, accompanied by itching. The mother and maternal grandfather had both had psoriasis. A biopsy had not been made. The patient had been treated with sulphur and boric acid ointment. There had been considerable improvement under treatment.

DISCUSSION

DR. SWARTZ: I think this is a case of early psoriasis. I have had a few cases, which with light therapy have cleared up rapidly and so far have not recurred. I would suggest quartz light therapy.

DR. HIGHMAN: I strongly suspect that this patient has not psoriasis. I do not think the diagnosis should be made in a child of this age except tentatively. The mere fact that the mother and grandfather both had this affliction does not indicate that this scaling is such. Moreover, they are not in a typical location for psoriasis. Today they suggest nothing more than what we might call seborrhea. I think the diagnosis of psoriasis should be held in abeyance.

DERMATITIS HERPETIFORMIS (?) PEMPHIGUS (?). Presented by DR. WHITE and DR. SWARTZ.

A Jewish man, aged 40, about ten months before presentation had noticed a few "cankers" in his mouth. He was treated by a dentist, and later by a local physician, without improvement. About two months before, he had noticed an outbreak of pimples and blisters on the trunk and face. On examination the patient showed grouped and nongrouped vesicles, varying in size from that of a small pea to a large bulla. Some of the vesicles appeared on clear skin, while others had a definitely red areola. The mouth showed numerous, small, superficial ulcerations without definite vesiculations. For the past few months the patient had been slightly hoarse, and had had a rather unpleasant sensation on swallowing. He had had three quartz light treatments, and liquor potassii arsenitis (Fowler's solution) internally. After the first two treatments there was a definitely visible improvement. The patient also felt better. After the last treatment, which was rather a strenuous one, the eruption became aggravated. The patient had had to stop taking the potassium arsenite on account of urinary symptoms. The last quartz light treatment was given about five days before presentation.

DISCUSSION

DR. FOX: The fact that the lesions began in the mouth and that there has been some definite loss of weight favors the diagnosis of pemphigus.

A CASE FOR DIAGNOSIS. Presented by DR. TOWLE.

A white man, aged 65, for four years had had an itching eruption of the body. He had had roentgen-ray treatments for two years, without relief. The eruption was on all regions of the body. Originally it was most abundant over the long nerves, but later became more widely distributed. At first the lesions were the size of a nut and were infiltrated, and the overlying skin was red. Surrounding these lesions was a broad zone of silvery white, and just beyond this a narrow zone of hyperemia. For a time the prominence of the lesions varied; one day they were prominent, and the next day not. The itching was intolerable. Later the mass enlarged peripherally, and became elevated, suggesting a stage of granuloma fungoides. When the lesions subsided anywhere they left a purplish stain, like that of dermatitis herpetiformis. Vesiculation did not occur at any time. Irritation of any kind caused the lesions to lift up like an urticarial wheal. The itching persisted; the condition of the blood was not unusual; the patient's weight was steadily decreasing.

DISCUSSION

DR. BECHET: Those lesions were sharply circumscribed, and with the nodules back of the ears and on the neck suggested the picture of mycosis fungoides.

TOTAL HEMIATROPHY WITH SCLERODERMA. Presented by DR. BOARDMAN.

A white girl, aged 9, an American school girl, was first seen at the Children's Hospital in August, 1926. About one and one-half years before presentation the child's mother had first noticed that her face was not symmetrical. Shortly after this she had noticed that the child began to limp. At that time she had not had any pain or discomfort, and presented a picture of a total right hemiatrophy. There were fibrillary twitchings in the tongue and in the pectoral muscles. There was unilateral perspiration and evidence of unilateral vasomotor disturbance. The superficial temperature of the two sides differed. A

general physical examination showed a thickening of the skin over the thigh and calf of the right leg. Neurologic examination showed general hyperactive tendon reflexes, more marked on the right side than on the left, with a right Babinski reaction and clonus. Results of a sensory examination were entirely negative. Measurements showed the long bones on the right side to be shorter than those on the left, while the circumference of the right arm and leg was also less. A roentgenogram of the skull was negative. A roentgenogram of the spine demonstrated a scoliosis of the right side in the lower thoracic region with a question of some wedging on the bodies of the eighth and ninth dorsal vertebrae. Definite evidence of local absorption was lacking. A blood Wassermann reaction was negative, as was the entire blood picture. The spinal fluid showed normal pressure, a normal cell count, a total protein of 31, sugar 0.062, globulin slightly positive and a colloidal gold reaction of 1111000000.

A Case for Diagnosis. Presented by State Infirmary at Tewksbury, Mass.

A white man, aged 60, married, a baker, had had influenza six years before presentation with subsequent appearance of sinuses in the chest (front and back). One of these was still draining. In spite of these he had been in fair health up to one year before presentation, when his right wrist began to swell. A physician opened this swelling (as a boil), and it healed. Six months ago a similar swelling appeared on the dorsum of the wrist, was opened a month later, but has persisted up to the present. He was admitted to the outpatient department two months ago, and to the House three weeks ago. The Wassermann reaction was negative, and roentgenograms of the arm give the appearance of a low grade osteomyelitis — probably not tuberculosis. Roentgenograms of the lung showed that the condition was mostly due to tuberculosis. There was a marked dulness over the right apex, front and back, also in the right axilla, and diminished breath sounds in front of this area. Sounds of the voice were increased in the right apex and axilla. There was broncho-vesicular breathing at both bases.

DISCUSSION

Dr. Weidman: I do not think this is a case of blastomycosis. The picture is so clearly indicative of tuberculosis that I should suggest that for a diagnosis. Against this is the extremely rapid involvement for such a large lesion. I may cite a previous case in which there was a demostration of tuberculous bullae in lesions which had grown practically over the entire thigh in eight months. The explanation, of course, is that in secondary infection there may be a reversal of ordinary ideas about the speed of development in tuberculosis of the skin. I have seen the same thing in carcinoma of the lip.

Dr. Boardman: The reason for showing this case was that it has both the complete roentgenographic pictures of the chest and arms, as well as microscopic evidence. The roentgenogram showed definite tuberculous involvement of the chest.

Dr. Wright: I should like to ask whether a fungus infection has been absolutely ruled out. I should favor it as a diagnosis rather than tuberculosis.

Dr. Boardman: Roentgenograms of the wrist and ulna showed a chronic osteomyelitis.

Dermatitis Exfoliativa. Presented by State Infirmary at Tewksbury, Mass.

A white woman, about four years before presentation had been operated on for carcinoma of the right breast. After excision, exfoliation began almost

immediately. She had had a positive reaction to the Wassermann test at one time, but arsenical treatment had not been given.

DISCUSSION

DR. PELS, Baltimore: I saw a case some time ago, also that of a woman, who had almost the same condition. This was diagnosed clinically as dermatitis exfoliativa or pityriasis rubra. She may have had psoriasis in the beginning, but we were not certain of that. After attempts to influence the eruption by means of arsphenamine and sodium thiosulphate, we proceeded to give autogenous serum in doses of about 10 to 15 cc. a week; approximately ten injections at intervals of three or four days have been given, and there has been a steady improvement.

KERATOSIS PALMARIS (ARSENICAL). Presented by DR. GARFIELD.

A white woman, aged 37, married, an American housewife, had had psoriasis for twenty years, and took arsenic in the form of solution of potassium arsenite (Fowler's solution), sometimes as many as 20 drops three times a day over a period of years. She showed typical psoriatic lesions on her body, arms and legs, and hard, warty lesions on both palms and soles. The latter lesions she had had for ten years.

WALTER T. GARFIELD, M.D., Secretary.

MANHATTAN DERMATOLOGICAL SOCIETY

Regular Meeting, Nov. 9, 1926

J. J. ELLER, M.D., *President*

EXTENSIVE CAVERNOUS ANGIOMA. Presented by DR. GILMOUR.

M. P., a woman, aged 41, unmarried, a teacher, said that when she was about 6 weeks old a dilatation of vessels had been noted on her right hand, and that it had gradually spread up the arm. Several operations were performed, without improving the condition. In 1909, she had an operation on the forearm; in 1910, on the upper arm; in 1912, on both arm and forearm; in 1917, on the back of the hand and on the thumb; in 1920 and in 1923, gelatin injections in the arm.

When presented, she showed numerous cavernous angiomas in small areas from the right hand up to the shoulder.

DISCUSSION

DR. SATENSTEIN: I recall a much more extensive case in which there was a lesion about the size of a small orange on the palm of the hand. A surgeon attempted to remove it. There was a severe hemorrhage, which was difficult to stop. He performed a little dissection on a lesion on the forearm and did not find any relation to the superficial veins; only to the deeper veins. These lesions are not ordinary angiomas but venous sinuses, and taking out the superficial veins will not accomplish much. There is no danger of malignancy. I advise against operation. Radium treatment might prove of benefit.

DR. LEVIN: The aim in any attempt at improvement of the condition should be to cut off the circulation from the deeper vessels.

DR. ELLER: I believe, as Dr. Levin does, that perhaps this nevus extends to and is connected with the deeper veins, and that surgical intervention is the best method. I do not think that a patient with a case like this should be left untreated. This type of lesion is unsightly, and it is important to attempt to improve the cosmetic appearance. Surgical treatment of these lesions apparently has improved the appearance a great deal, and I think that further treatment is indicated.

DR. OCHS: I had a similar case in which the condition extended from the thigh to the toe. The patient had been operated on with a fairly good result, but within two years the condition recurred. When the surgeon was called in, he refused to operate, and gave the same reason that Dr. Satenstein mentioned — that these dilatations are really cavernous sinuses and behave much as do varicose veins.

ANGIOMA OF THE SCALP CURED BY RADIUM, WITH RETURN OF HAIR AT THE FORMER SITE OF THE LESION. Presented by DR. ELLER.

A boy, aged 3, had had an angioma the size of a quarter. It was red, soft and raised about three-eighths of an inch (0.9 cm.) above the level of the skin. The lesion was treated with suberythema doses of radium. A filter of 2 mm. brass was used in order to employ only the gamma rays. The angioma had disappeared, leaving the skin in good condition and with a return of the hair to its former site. A photograph was exhibited showing the lesion before treatment.

DR. KINGSBURY: The result is good, but I cannot get up much enthusiasm about it, for if it was the type of angioma shown by the photograph it would get well spontaneously.

DR. LEVIN: I agree with Dr. Kingsbury that this was a type of nevus which would show a tendency to spontaneous disappearance. However, in most cases this does not occur. It would seem to be advisable not to wait for spontaneous disappearance but to treat the patient with radium or preferably with carbon dioxide snow.

DR. SATENSTEIN: It is known that radium will cure such lesions, but it is not known which ones will disappear spontaneously. I think all patients with such cases should be treated.

SCROTAL ECZEMA. Presented by DR. OCHS.

M. K., aged 35, had for five years suffered from an intolerable pruritus confined to the scrotum. He had had all kinds of treatment, including about ten exposures to the roentgen rays.

When first seen, the skin of the scrotum was thickened and excoriated. There was profuse weeping.

When presented, he showed a thickened dry scrotal skin with here and there some superficial fissures. Ultraviolet radiation gave temporary relief.

The case was submitted for advice as to treatment.

DISCUSSION

DR. ANDREWS: I am surprised that the condition did not disappear under ten roentgen-ray treatments. At present, I think the best treatment would be

something soothing and I would suggest butysin picrate ointment or wet dressings.

DR. GILMOUR: The indicated treatment is rest in bed and soothing local applications.

DR. LEVIN: I agree with Dr. Gilmour that a soothing form of treatment would be advisable at present. Rest in bed with support of the scrotum and the use of a wet dressing would be indicated first. Later, the scrotum should be supported by means of a suspensory. Further treatment would depend on the pathologic condition. This is an obstinate case, and a type that often resists roentgen-ray treatment.

DR. FELDMAN: In a few of these cases roentgen-ray treatment has not yielded good results. I have one particular case in mind that lasted for eight or nine months. The patient had six roentgen-ray treatments without beneficial results; he was finally put to bed for a month, soothing local applications were applied, and the condition disappeared.

DR. BECHET: I think the mistake in this case has been the use of strong applications. I believe that suspension, together with mild, nonirritating local treatment will prove of benefit. Strong remedies often aggravate such conditions.

DR. PAROUNAGIAN: I have great faith in chrysarobin applications — 5 per cent in chloroform. I am inclined to believe that most of these cases are parasitic in origin.

DR. OULMANN: If this were a case of dermatophytosis, there would be lesions on the thighs or perineum. This is an acute dermatitis, in which a 5 per cent chrysarobin application would be too painful. Mild treatment with rest and later the application of a mild tar preparation would be my selection.

DR. ELLER: If I were treating this patient, I would put him to bed and apply to the lesion constant wet dressings of Burow's solution — one quarter strength — for a week or ten days; I would then apply a three quarter unit dose of the roentgen ray, being careful to protect the testicles by having them screened and held out of the path of the radiation. I would repeat this dose in four weeks, and in all give about three such treatments. Sometimes a single large dose of the roentgen ray will effect relief when fractional treatment fails.

DR. OCHS: The roentgen-ray treatment was given by an expert. The patient has been unable to tolerate an ointment containing even 0.25 per cent menthol or 0.5 per cent phenol. He was in bed two weeks. The only treatment that has been tolerated is applications of talc. I am glad to receive all the suggestions.

SCLERODERMA WITH TUMEFACTION. Presented by DR. BECHET.

L. S., a girl, aged 19, came to Dr. Aitkin's service suffering from an extensive scleroderma. The face was greatly contracted, and the hands were markedly affected by sclerodactylia. The disease had been present for one year and was rapidly becoming worse. Some months after the incidence of the scleroderma, she noticed some nodules on the flexor surface of the right thumb and a few on both knees. These steadily grew larger until the time of presentation, when she had clearly outlined, hard, fibrous masses on the entire flexor surface of the right thumb and over the distal end of the metacarpal bones of the same hand. She said that she could squeeze out gelatinous fluid from the tumors on the thumb and that they were not painful. The lesions

on the knees assumed a somewhat different appearance. They were much smaller and seemed to have sinus-like openings which extended down to the subcutaneous structure.

DISCUSSION

DR. ELLER: The lesions on the hand suggest synovial cysts, although such lesions usually occur on the dorsal surfaces.

DR. ROSEN: It is an interesting case. I do not know how to explain it. The patient has a generalized scleroderma with infiltrations on the hands and knees, also pigmentation and scratch marks. The pigmentation looks like the pigmentation following the administration of arsenic. I have seen a 4 year old child with congenital syphilis, perfectly well otherwise, who had been receiving intramuscular injections of neoarsphenamine and who developed a generalized scleroderma which I thought was due to the arsenic. This girl has been employed in a perfume factory for six years. I suggest that a complete study of the blood be made, especially for arsenic.

DR. SATENSTEIN: I think the lesions on the hands are synovial cysts. They are globular and tense but not solid. The patient has been able to squeeze some substance from them. The nodules on the lower extremities are not foreign to scleroderma. Dr. Wise has recorded similar instances.

DR. ANDREWS: The lesions on the hand might represent synovial cysts.

DR. FELDMAN: The lesions on the hand are probably synovial cysts.

DERMATITIS HERPETIFORMIS. Presented by DR. OCHS.

A little girl, aged 8, had had recurring lesions for seven years which had resisted all kinds of treatment, including treatment with the roentgen ray. The lesions consisted of grouped papulopustules which itched excessively. Since the onset she had not been free from them; however, the disease was lighter in summer than in colder weather.

DISCUSSION

DR. SATENSTEIN: This seems to be a case of pediculosis with impetiginous dermatitis. The patient has scratch marks on the back, with impetigo on the nape of the neck and on the hands. The skin is generally dry, and a tendency to itch is not unusual in dry skins. The pigmentation is possibly due to the constant scratching.

DR. GILMOUR: I agree with Dr. Satenstein, that there is secondary impetigo, but the history of repeated attacks of grouped vesicles and bullae over a period of years certainly suggests dermatitis herpetiformis, and that is my diagnosis.

DR. LEVIN: I do not agree with the diagnosis of dermatitis herpetiformis, because of the nature of the lesions and their distribution. The skin presented an intensely itching eruption with a generalized dryness and harshness, and eczematized patches on the flexures. There was also a tendency to the formation of a generalized papular eruption. I consider the case one of prurigo or an early phase of a generalized neurodermatitis.

DR. SPINNER: I think it is a case of neurodermatitis with secondary infections.

DR. BECHET: I agree with the diagnosis of dermatitis herpetiformis. The child has had the eruption for a long time; it is bullous, intensely pruritic, with circinate grouping. There are, of course, pustules, but they are probably caused by a secondary infection. I think that the pruritus, the duration and the marked tendency to grouping are sufficient reasons to make the diagnosis.

DR. OULMANN: The history of seven years' duration and the marked scarring and pigmentation, the grouped vesicles, and other points favor the diagnosis of dermatitis herpetiformis. Pediculosis and pyoderma may also be present.

DR. ROSEN: The presence of pustules does not rule out dermatitis herpetiformis. There are cases in which the primary lesion may be a pustule. In one of my cases, the lesions were umbilicated like smallpox lesions, and had healed with distinct scars.

NEVUS PIGMENTOSUS SHOWING RESULTS OF LORTAT-JACOB'S CRYOCAUTERY. Presented by DR. ELLER.

A woman, aged 23, when first seen, presented a birthmark on her left hand and forearm. It consisted of innumerable brownish-black moles, varying in size from that of a pinhead to that of a pea, and situated about one eighth to one quarter of an inch (0.3 to 0.6 cm.) apart. The entire eruption was removed with the cryocautery method of applying carbon dioxide snow.

A photograph was presented showing the eruption before treatment.

DISCUSSION

The members all agreed that the result was excellent.

LUPUS ERYTHEMATOSUS. Presented by DR. PAROUNAGIAN.

E. G., a private patient, aged 50, had been presented by Dr. Parounagian at the October meeting of the Society, with the diagnosis of lupus erythematosus, which was accepted by the majority of the members present. The presenter, however, did not feel sure of the diagnosis because there was only a single lesion which had resulted from an injury. The possibility of superficial epithelioma had been considered. At the suggestion of Dr. Satenstein, that it might possibly be of parasitic origin, two applications of chrysarobin were made —5 per cent in chloroform — which produced such marked improvement that it was thought wise to present the patient again for observation.

DISCUSSION

DR. SATENSTEIN: The improvement from the use of chrysarobin would indicate a fungus infection. I am disappointed that the presenter did not confirm the diagnosis of a fungus infection before the chrysarobin therapy was started.

DR. LEVIN: The lesion still showed follicular plugs. I think it is lupus erythematosus with inflammatory reactions from some external irritant.

SUPERINFECTION WITH SYPHILIS. Presented by DR. PAROUNAGIAN.

E. K., aged 32, had contracted syphilis about two years before presentation through anal exposure, for which he had received eight treatments with arsphenamine and one with mercury, and some medicine internally. He had been free from outward manifestations of the disease until about two months prior to presentation, when he was again exposed and developed a lesion at the anal orifice, which was followed by roseola, mucous patches in the throat and general adenopathy. In addition, he presented a high palate arch, irregular teeth and a mentality which suggested the possibility that he had congenital syphilis as well. The results of the Wassermann test had not yet been reported.

Secondary Syphilis and Psoriasis. Presented by Dr. Parounagian.

T. C., aged 31, who had been troubled with psoriasis for the past fifteen years, contracted a chancre about six months prior to presentation, the scar of which showed near the frenum. Recently he had been operated on for a cyst on the neck, and as his reaction to the Wassermann test was 4 plus he had been referred to the Bellevue syphilis clinic for treatment. Examination revealed syphilitic alopecia, mucous patches on the tonsils, general adenopathy and a scar to the left of the frenum. He also had a generalized papulosquamous syphilid and typical lesions of psoriasis.

Allonal Eruption. Dr. Ochs.

Dr. Ochs said that at the last meeting of the Society he had reported a case of bismuth exanthemas, and now wished to report a case of allonal eruption.

David L. Satenstein, M.D., Secretary.

ST. LOUIS DERMATOLOGICAL SOCIETY

Regular Meeting, Nov. 10, 1926

Robert H. Davis, M.D., *Presiding*

Localized Hyperhidrosis. Presented by Dr. Tobias.

E. H., aged 21, had suffered for the last two years with a condition which began with increased perspiration affecting the back of the left foot. The skin of the involved area then became red and macerated from the continuous oozing of sweat. The perspiration was so marked that it affected the stocking and lining of the shoe. At presentation, the lesion was about the size of a silver dollar. The overlying skin was glazed and covered with large beads of sweat. The lesion was well demarcated, the border showing signs of active inflammation.

DISCUSSION

Dr. Tobias: My diagnosis of localized hyperhidrosis was based on the history and the local appearance of the lesion. I could find nothing definite as to the cause of the condition. Careful examinations have been made from the standpoint of nerve involvement and vascular disturbance, but all results have been negative. About two years ago, when the condition first appeared, there was no fetid odor. Sutton reported a case in 1917, stressing the pathologic condition of a case. He found nothing but hypertrophy of the sweat glands, and summed up his observations by saying that little was known of the etiology of the condition.

Dr. Grindon: I have seen localized sweating limited to half the face, the other half remaining absolutely dry, suggesting a nervous origin.

Dr. R. H. Davis: Unilateral sweating of the face may have some connection with migraine.

Dr. Grindon: Migraine has been spoken of in connection with localized hyperhidrosis.

LATE SYPHILIS OF THE FOREHEAD. Presented by DR. TOBIAS.

M. D., a colored woman, aged 71, a patient at the City Sanitarium, said that the condition had begun two years previously over the right temple, gradually spreading until it involved the entire forehead, extending from the hair line to the bridge of the nose and from the right temporal region to the left temple. The lesion was symmetrical, butterfly-shaped. It was circinated, with central scarring and peripheral ulceration. On the left side there was some central keloidal scarring. The Wassermann reaction was four plus.

DISCUSSION

DR. GRINDON: There is marked ulceration in some areas. I think the condition is syphilis.

DR. TOBIAS: I presented the case for diagnosis. I hesitate to decide between lupus erythematosus and late syphilis. It is rare to find late syphilis so symmetrical.

DR. DAVIS: The ulceration would suggest late syphilis, though again there is not as much infiltration as one would expect to find.

EROSIO INTERDIGITALIS (BLASTOMYCETICA?). Presented by DR. GRINDON.

A Russian Jewess, aged 50, married, engaged in housekeeping, had had a condition of three years' duration, without change or seasonal influence, on the webs between the third and fourth fingers, symmetrically distributed, presenting an eroded and macerated surface. It was very painful. Smears were negative. Cultures on several mediums, including Sabouraud's and glucose agar, at the end of four days showed only scattered colonies of the white staphylococcus.

DISCUSSION

DR. STRYKER: This case is of unusual interest to me as I have done some special work along this line during the last year. I have secured cultures from six cases. In one case, I failed; in another, the culture from which is now growing, I have seen the organism itself, but it is mixed with staphylococcus. Dr. Fleisher and I reported three cases. We decided that the organism was not the blastomyces of Gilchrist and Stokes. The organisms from this disease which we have studied belong to the class fungi imperfecti, genus *Monilia;* they have hyphae conidia but no asci. They reproduce by budding.

DR. TOBIAS: These cases occur almost entirely in orthodox Jewish women who do their own housework. Kosher rites forbid the use of soap, for which these women substitute harsh washing powders which irritate the skin of the fingers. This may be a factor in the etiology of such cases from the standpoint of lowered local resistance.

DR. GRINDON: I did not make a definite diagnosis as I was in doubt as to whether the condition was "blastomycetica." I did not find anything in the culture but the white staphylococcus. This may have been because of faulty or imperfect technic. With regard to Dr. Tobias' comment on the peculiarity of this condition in orthodox Jewish women, I have a case in a patient in private practice, a Jewish woman, the wife of a Jewish physician. Her case is similar to this one, the lesions being on the webs between the third and fourth fingers. No treatment has helped her. The husband tells me that his wife is neuropathic, and that the condition is aggravated or lessened depending on his catering to or opposing her will. I think that the neuropathic element is a factor. A case reported by Sutton showed the same localization.

at the interdigital spaces, between the major and ring fingers of each hand. The symmetry suggests that there is some factor besides an organism. I would ask Dr. Stryker whether any inoculations have been made.

DR. STRYKER: I have not made any inoculations, but others have made them successfully.

DR. GREINER: I have seen two cases both of which were limited to one hand.

DR. LANE: In my experience, the condition has been seen on every finger web but the first. One woman had it on the third web, only. All the patients have been women, and all have shown marked improvement on keeping the hands out of water. The condition has been entirely cured with zinc and alcohol.

DR. DAVIS: As regards the neuropathic element in these conditions, I recall the case of one woman in whom it was severe. At the time, she was under a constant nervous strain, taking care of a daughter who was bedridden with partial paralysis.

ULCERATIVE STOMATITIS. Presented by DR. GRINDON.

A Russian Jewess, married, aged 44, had suffered from headaches of a neurasthenic type one day in every four to six weeks, also from occasional pains in the legs. She frequently had felt prostrated. Her appetite had been poor; her diet was limited to soft foods on account of loss of the molars. She was obese. The present trouble began eight months before, with several brief intervals of apparent recovery. An eroded surface, covered by a thin, yellow, necrotic layer, three-quarters inch (1.9 cm.) in longest diameter, occupied that part of the right buccal mucosa traversed by the line of dental occlusion, a little behind the right oral commissure. Surrounding it was a wide, bright inflammatory areola. There was a much smaller but similar lesion at a corresponding area on the left buccal mucosa; also one at the right border of the tongue opposite the buccal lesion. All were slightly painful. Adenopathy was not evident. The condition began on the left side. The lesion healed spontaneously and appeared on the right mucosa. The other lesions also healed and returned. All the surfaces were healed about September 15, and there was a recurrence two weeks later. The buccal surfaces away from the ulcerations were a milky color in places. The dorsum of the tongue showed prominent papillae, capped by thickened opaque epithelium. Toward the middle third, anteroposteriorly, the lesions were larger and somewhat hard and rough. The appearance was somewhat like that of minute warts. The blood examination showed: hemoglobin content, 90 per cent; color index, 0.9; red blood cells, 4,898,000; white blood cells, 6,000; polymorphonuclears, 48 per cent; mononuclears — large, 12 per cent; small, 30 per cent; no poikilocytosis or anisocytosis. The smears showed many white cells, squamous epithelium and a gram-positive, short streptococcus.

DISCUSSION

DR. GRINDON: Dr. Senseney saw the case with me. He had observed a vast number of cases of mouth disease in France while in the service, but said that he had never seen anything like this.

A CASE FOR DIAGNOSIS. Presented by DR. SEALE. (From the Barnard Free Skin and Cancer Hospital, service of Drs. M. F. Engman and W. H. Mook.)

B. B., a white woman, aged 30, gave no history of previous serious illness. She had undergone a tonsillectomy four years previously. The present eruption

had persisted on the face, neck and arms for the last eleven years. It was of a recurrent nature, the patient at times being entirely free from it. She had had five children, three of whom are living. During each pregnancy, beginning at the second month, the patient remained free from the eruption until the termination of pregnancy, after which it reappeared. Aside from this period of remission, the longest interval had been two weeks. The condition manifested itself or became aggravated immediately before the menstrual period, diminishing after that time, although there were times when the process did not subside before the next menstruation. The menses were regular in both time and duration, although the flow was scanty. Physical examination showed scattered bright red maculopapules on the extensor surfaces of the arms, varying in size from 0.5 to 1 cm. in diameter. On the cheeks there was some rather deep induration. On the assumption that the eruption was due to ovarian dysfunction, corpus luteum 3 grains (0.2 Gm.), was administered intravenously once daily for five days (at the suggestion of Dr. Fred J. Taussig). The condition improved greatly under this treatment.

DISCUSSION

DR. STRYKER: Evidently the condition is one of those of the erythema multiforme type associated with pregnancy. The corpora lutea persist during pregnancy. At that time the condition clears up. At the termination of pregnancy and lactation the corpora lutea cease to function, and then the condition returns. Dr. Seale injected extract of corpus luteum into the veins, and the patient recovered. There is, possibly, a definite connection between the two manifestations.

DR. TOBIAS: I would call the condition erythema multiforme, aggravated by menstruation. Many skin conditions flare up at the menstrual period. Possibly at that time the skin is more sensitive, as a result of the activity of the endocrine glands.

DR. SEALE: Ovarian extract was administered for several days without improvement of the skin condition. After the second injection of corpus luteum, however, the condition improved. Fordyce told of two cases of lupus erythematosus in which the eruption disappeared during pregnancy, reappearing at the termination of the condition.

DR. MOOK: The lesion is apparently an erythema multiforme-like eruption, due to a disturbance of the ovarian function. This is shown clearly by the history. The lesions on the face somewhat resemble an acute attack of lupus erythematosus, but differentiation could readily be made by a microscopic section.

DR. DAVIS: Clinically, the condition resembled lupus erythematosus much more closely than it did erythema multiforme when the patient first came to the clinic. At present it looks more like erythema multiforme undergoing retrogression. Fordyce reported two cases of lupus erythematosus disappearing during pregnancy, and one case of lupus erythematosus, existing only during pregnancy. Dr. Taussig had never seen anything like the condition, and suggested the corpus luteum injections now, and placental extract later, if the corpus luteum aggravated the condition. It was feared that it might become aggravated under treatment with corpus luteum, so that the contrary effect was gratifying.

A Case for Diagnosis. Presented by Dr. Seale. (From the Barnard Free Skin and Cancer Hospital, service of Drs. M. F. Engman and W. H. Mook.)

J. M., a white man, aged 74, three months before presentation noticed a lesion on the left forehead at the hair line, following a protracted illness of eight weeks' duration (influenza). Shortly after this, other lesions appeared over the body. After three weeks the initial lesion increased in size to that of an egg, at which time it was opened; a considerable amount of foul-smelling pus was liberated. The patient's general health had been poor since his recovery from influenza.

At presentation the following lesions were observed: two on the right cheek, and one on the nose, the right forearm, the right thigh, the left leg, the buttocks, the left third finger and the posterior surface of the right side of the chest. The lesions varied from 1 to 5 cm. in diameter, the majority being 4 cm. in diameter. The individual lesions were oval or circular, having a sharply defined border. They were covered with a dry, thick crust which rose above the surface. On pressure a thick, foul-smelling, brownish red to creamy pus exuded from under the crust. On removing the crust from one lesion, the edges were found to be raised and rolled. The center was slightly punched out. The color was a dirty red. Copious brownish red pus covered it. There was no definite induration. On examination of the pus from the lesion, several circular bodies from 20 to 40 microns in diameter were found. They were enclosed in a thin, refractile membrane. The cytoplasm stained faint blue with methylene blue. A fine reticular network was seen. The nucleus was from 5 to 10 microns in diameter and stained dark blue. It also had an enveloping membrane, and a small dark nucleolus was noted.

DISCUSSION

Dr. Mook: Clinically the lesions on the face are typical of blastomycosis. The lesions on the forearms and right thigh are not so typical. They might be due to amebas, but it would require a section of the skin and a study of the architecture of the lesion to determine whether it is amebic or blastomycetic. The condition is probably blastomycosis with amebas in the blastomycetic lesion. The duration of the disease is against the diagnosis of an amebic infection. Another feature is that the lesions spread slowly; in amebic infection, they will spread an inch a day.

Norman Tobias, M.D., Secretary.

BROOKLYN DERMATOLOGICAL SOCIETY

Regular Meeting, Nov. 15, 1926

John Graham, M.D., *Presiding*

Sclerema Neonatorum. Presented by Dr. Abramowitz and Dr. Skeer.

This case was previously presented at the September meeting of the Society, and is now presented again to show the results of the treatment. The patient had had three exposures to the roentgen ray at three week intervals, each exposure consisting of 5 milliamperes, given at a distance of 10 inches with a spark gap of 7 inches, for 60 seconds. The patient's skin is now freely pliable and

can be folded and wrinkled. The induration which had been of board-like hardness is markedly decreased and the condition greatly improved. The baby has gained considerable weight.

DISCUSSION

DR. ABRAMOWITZ: The usual treatment recommended is heat, baking and massage. The child was sent to the clinic for roentgenographic examination because it was thought that the masses which were felt might be due to some involvement of the muscle such as myositis ossificans. By error, the child was given an unfiltered therapeutic exposure of one third erythema dose. After an improvement was noted, three more exposures were given. The sclerema has entirely disappeared.

PURPURA ANNULARIS TELANGIECTODES? Presented by DR. THRONE.

S. W., a white man, a Jew, aged 25, had had the condition for two years. The history and the examination were negative except for the skin condition.

The inner side of the left ankle showed pigmented, elevated, rounded lesions suggestive of lichen hypertrophicus. The same side of the right foot showed small pigmented lesions which were not elevated. Some of the lesions were annular and seemed to show some atrophy. They resembled purpura annularis telangiectodes, to some extent.

Biopsy report showed slight hyperkeratosis and acanthosis. There was flattening of the papillae. The papillary body and upper derma showed a marked increase of capillaries between which there were many pigmented phagocytes. There was some pigmentation of the basal cell layer of the epidermis and scattered pigment, cellular and extracellular, all through the lower derma. The histologic report was made by Dr. Jessup at the New York Skin and Cancer Hospital.

The patient was given sodium thiosulphate, 1 Gm., daily by mouth for one week, after which the urine was examined for arsenic. This examination showed 0.066 Gm. of arsenic per hundred grams of dried specimen. The possibility of arsenical dermatitis had been considered.

PSORIASIS AND ARSENICAL DERMATITIS. Presented by DR. THRONE.

E. C., a man, a Jew, aged 40, applied for treatment at the New York Skin and Cancer Hospital on Sept. 23, 1926. He had had psoriasis for years, which had become general, but which was more marked on the hands, the palms being so involved that it was practically impossible to close the hands. The palms and soles showed a few keratoses. On account of the condition of the palms and soles a diagnosis of arsenical dermatitis on an old psoriasis was made, and the patient was given sodium thiosulphate, 0.5 Gm. intravenously, every third day and 1 Gm. by mouth, on alternate days. He was given a soothing ointment (hydrous wool fat and petrolatum) externally. He was not given any active treatment for the psoriasis.

Examination of his urine showed arsenic in a pathologic amount. Under the treatment with sodium thiosulphate, the patient has recovered almost entirely; the palms and soles are free from eruption. The face has cleared up, and the trunk and limbs show only a moderate number of typical psoriasis patches.

DISCUSSION

DR. THRONE: It is possible that most of the cases of so-called palmar psoriasis are cases of arsenical dermatitis. I do not think that anybody has

ever claimed that sodium thiosulphate has had any effect in psoriasis. In this case, and another of the same type which I presented some time ago, an examination of the urine showed more than 30 mg. of arsenic in the urine. The evidence seems to bear out my contention that this type of case probably has an arsenic causation.

An examination of the urine of the man with the possible Majocchi's purpura showed 66 mg. of arsenic, after sodium thiosulphate had been taken for one week. This is more than twice the normal amount which Dr. Myers says is up to 30 mg. I think every one will agree that this patient does not present a typical case of Majocchi's disease. It may be a case of arsenical dermatitis.

Dr. Abramowitz: In these cases of Majocchi's purpura telangiectasia and annular purpuric lesions usually developed, also atrophy. The atrophy sometimes is mild, and the lesions are not elevated. Lesions may appear on other parts of the body, the legs being the most frequent site, although one case in which there were lesions in the mouth has been reported. As far as I can recall, the essential point in the pathology of Majocchi's purpura is hyaline degeneration of the vessel walls and collagen.

Dr. Best: As regards the oral administration of sodium thiosulphate, I do not think there is any doubt as to its value. In two cases of arsphenamine dermatitis within a week after the oral administration of 30 grains (2 Gm.) daily, the patients were greatly improved. I have seen similar cases in which the patients drag along for months before they completely recover prior to the use of sodium thiosulphate.

A Case for Diagnosis: Prurigo-Like Eruption. Presented by Dr. Chargin.

D. B., a man, aged 34, unmarried, a waiter, said that the eruption first appeared on extensor surfaces of the arms and legs about eight years before presentation. Since then, new lesions had appeared from time to time. The patient said that there was not any itching but that he had acquired the habit of scratching the lesions, especially when he undressed before retiring. His general physical state was good.

The eruption was distributed over the extensor surfaces of the arms and legs, the upper part of the chest and back, and the buttocks. The flexor surfaces of the arms and legs were free from eruption. The elementary lesion was a pea-sized and larger papule. The lesions and their remains were for the most part isolated, being scattered in an irregular manner over the affected areas. They were numerous, numbering many hundreds, and they were mostly healed and pigmented. There were a few patches of grouped healed lesions as manifested by grouped pigmented areas. All the recent lesions were excoriated. The general aspect was that of irregularly distributed scratched papules and pigmented areas.

The blood Wassermann reaction was negative. The blood count showed 7,000 white cells, 67 polymorphonuclears and 33 lymphocytes. Eosinophils were not observed.

Potassium iodide had been administered over a period of three years, without any evident provocation.

DISCUSSION

Dr. Walzer: Dermatitis herpetiformis need not be generalized. It may be limited to various parts of the body as in this case. The size of the lesions may also be variable, so the fact that these lesions are a little larger than those usually seen in Duhring's disease is not a point against such a diagnosis.

Since certain parts of the body are free, grouping is indicated. Also there is a tendency of the lesions in many places to cluster. In spite of what the patient says, there is marked evidence of itching, as is shown by the numerous excoriations.

Scarring and pigmentations are present. All these facts favor the diagnosis of dermatitis herpetiformis.

Dr. Skeer: My diagnosis is dermatitis factitia.

Dr. Best: I believe it is a case of neurotic excoriations. The lesions seem to be on those parts of the body that the patient can reach easily with his hands. The patient said that the scars were due to lesions which he had "picked off to pass the time." This would show a neurotic tendency. The lack of true herpetiformity and the lack of severe itching, both cardinal symptoms of Duhring's disease, would be against that diagnosis, in my opinion.

Dr. Rulison: The patient insists that there is no itching. The blood does not show any eosinophilia. My premise about eosinophilia is that in chronic itching conditions eosinophilia will be present. If the man says that there is no itching, and the blood does not show any eosinophilia, I am inclined to believe the eruption does not itch. If this is true, Duhring's disease could hardly be considered.

Dr. Abramowitz: It is hardly wise to make a diagnosis of neurotic excoriations unless the patient has been observed closely over a period of time. Irrespective of whether itching is present or not, the patient shows evidence of scratching. The eruption is symmetrical and is grouped only in a few places. It is chronic and shows areas of pigmentation and depigmentation. The usual cases of neurotic excoriations do not show lesions on the extremities alone. The patient picks the entire body. Prurigo is of course more or less of a symptomatic diagnosis and does not convey any definite idea as to a particular skin disease. I should not have considered neurotic excoriations in this case, but since it was brought up, it should be ruled out. The patient should be taken to a hospital where his legs and arms can be bandaged, and he is under observation. If the lesions heal, the excoriations are neurotic. The appearance of the lesions, alone, however, indicates Duhring's disease.

Acrodermatitis Chronica Atrophicans. Presented by Dr. Cantor.

J. D., a widower, born in Germany, aged 62, complained of an eruption on his lower extremities which had been present for a number of years. The extremities revealed atrophy of the skin, with loss of hair, and patches of dermatitis having a brownish color. The cutaneous blood vessels were conspicuously visible, and there was a beginning ulceration on the right leg and foot, with scleroderma-like infiltration of the right leg. The upper extremities were not involved. The salient facts of his personal history were that he had been doing hard outdoor work in a lumbar yard for thirty-nine years, that he had had a fracture of the right foot near the ankle four years prior to presentation, and that once, when a boy, he had run many miles to get a physician, after which he had become unconscious and had lain in bed with swollen feet for three days.

DISCUSSION

Dr. Walzer: About a third of the cases of acrodermatitis chronica atrophicans show scleroderma-like patches on the legs or feet. Since in this case the scleroderma-like patches are within the area of atrophy, and on no other part of the body, it is to be assumed that the atrophy came first and the

scleroderma after; in other words, it is a sclerosis of the skin after the skin had become atrophic. This certainly is not the case in scleroderma, in which the atrophy follows the sclerosis.

DERMATITIS EXFOLIATIVA (WILSON-BROCQ). Presented by DR. FRANK. (From the service of Dr. Best, Kings County Hospital.)

F. W., a man, aged 34, married, a laborer said that about two weeks prior to his admission to the hospital on July 11, 1926, he noticed a red itchy condition of the right forearm. By the following day this had spread to the face and the other arm. On admission to the hospital he exhibited erythema and edema of the face, eyelids and arms, especially the articular folds, with a tendency toward vesiculation, causing crusting and scaling. Constitutional symptoms were not noticed. A diagnosis of dermatitis venenata was made. His condition improved and was discharged, July 17, 1926.

On July 24, 1926, one week later, he was readmitted to the hospital. At this time he showed a recurrence of the condition on his face and upper extremities and further involvement of the trunk and lower extremities, and exhibited a more or less generalized erythematous rash with some infiltration of the skin, scaling and fissuring. He complained of intense itching and from that time on, developed a generalized desquamative eruption.

He showed an erythematous, infiltrated (moist in some places), exfoliative condition of the entire integument. The scales were thin, lamellated, and appeared to be adherent at the border. The hair and eyebrows showed marked thinning, and the nails were thick and dystrophic.

Laboratory examination showed: red blood cells, 5,088,000; hemoglobin, 90 per cent; white blood cells, 9,500; differential count: polymorphonuclears, 55; small mononuclears, 32; large mononuclears, 2; transitionals, 3; eosinophils, 8; urine, normal. The Wassermann reaction was negative.

Biopsy showed considerable thickening of the stratum corneum with parakeratosis. The rete was thickened. There was marked edema of the corium and vascular dilatation with perivascular round cell infiltration.

DISCUSSION

DR. BEST: There are several clinical types of dermatitis exfoliativa, namely, the Wilson-Brocq type, the Hebra type, dermatitis exfoliativa epidemica (Savill) and dermatitis exfoliativa neonatorum (Ritter). The case seems to be of the Wilson-Brocq type.

DR. ABRAMOWITZ: I doubt that this is a case of dermatitis exfoliativa of the Wilson-Brocq type. It seems to me that this patient has an anaphylactic dermatitis. I think that instead of accepting the diagnosis as a definite conclusion further investigation should be made to exclude contact with various irritants.

A CASE FOR DIAGNOSIS: LICHEN PLANUS-LIKE LESIONS ON THE HARD PALATE. Presented by DR. CHARGIN.

J. F., a policeman, married, aged 52, said that he had not had any venereal disease. He had had typhoid fever when 31 years of age. An eruption of the mouth was noticed first a year prior to presentation. He had smoked a pipe for 35 years. There was a verrucous lesion in the center of a large group of lichen planus-like lesions on the hard palate. The Wassermann reaction was negative.

DISCUSSION

A diagnosis of lichen planus was favored by Dr. Best and Dr. Rulison, although the lesions were not typical.

DR. WALZER: The papules have not the location, color or shape of lichen-planus of the mucous membrane. I am unable to make a diagnosis, but I do not think that it is lichen planus.

ACTINOMYCOSIS. Presented by DR. WALZER.

M. G., a school girl, aged 16, had had the ordinary diseases of childhood. About two months prior to presentation a lower, right molar tooth was filled. A painless swelling in the right side of the neck began six months before presentation. As presented, on the lateral surface of the right side of the neck, beneath the jaw, there was a painless subcutaneous, hard, elongated tumor, 1½ inches by about one-half inch, and elevated about one-half inch above the surface of the skin. The upper part of the lesion was red, more superficial, felt very soft, and had a fistulous opening, which occasionally discharged a little pus and yellowish-white tiny granules. There were no ulcerations in the mouth, and the unsound teeth on that side of the mouth had all been filled. There were enlarged glands. The specific organism had not been demonstrated.

GRANULOSIS RUBRA NASI. Presented by DR. BERKOWITZ.

H. B., a youth, white, aged 18, had had an eruption on the nose for six years. When presented the lower end of the nose was dark red, and there was hyperhidrosis in this area. In addition, there was acne vulgaris of the face, telangiectasis of the right shoulder and arm, and a keloid on the right wrist.

DISCUSSION

DR. ABRAMOWITZ: The patient shows a type of granulosis rubra nasi that is described in the earliest stage. Little red papules have not appeared, and it is difficult to make a definite diagnosis until this occurs.

DR. SKEER: I think the patient did have some pinpoint papules on the nose. He has hyperhidrosis and the region around the cartilagenous area is the typical color, slightly red. The condition may be rosacea, but the capillaries are not dilated, and besides, the patient is too young for that. It might be lupus erythematosus, but he did not show any atrophy which would be present when the condition was of such a long duration.

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Index to Current Literature

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